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ABSTRACT

The intent of this instructional manual, which is aimed at exploring the literature of a discipline and presented in a self-paced, course segment format applicable to any course content, is to enable college students to conduct computer-based interactive searches through multiple databases. The manual is divided into 10 chapters: (1) Introduction, which presents a rationale for teaching online searching skills to chemistry students; (2) Introducing Students to Database Searching, which begins by noting that the process of interactive searching involves practice on the use of a computer, modem, software, and telecommunications networks, and helps teach both organization, logic, and in-depth understanding of the subject, and competent, efficient use of the library; (3) Pros and Cons of Course Segment Approach; (4) Getting Started, which covers computer workstations; (5) The Data Base Vendor; (6) Special Notes, which addresses how to overcome a lack of journals at the library and set up security on the network; (7) Reference Material, which suggests five additional sources of information for students; (8) Weekly Procedures and Lessons, which contains 8 lessons over a 10-week period; (9) Online Searching Basics, which includes truncation, codes, order, and the map command; and (10) Miscellaneous, which covers Dialog, Datalog Plus, and Ring System Searching. A glossary of terms and an index are also provided. (ALF)

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Computer-based Interactive Literature Searching for CSU-Chico Chemistry Students

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January 1991

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CHAPTER I
INTRODUCTION

This program was supported by an Instructional Development Lottery Grant from the California State University (CSU).

Chemistry is the study of the composition, structure and reactions of matter. In chemistry as in all disciplines, scientific and otherwise, the results of new studies must be effectively communicated. In an effort to improve the training of university students towards this end, writing proficiency requirements are present in most undergraduate majors programs. Recently at California State University at Chico, this requirement has been extended to every course in every major.

Writing assignments include the communication of creative, original work. An important component of these assignments is a review of related literature published in books, journal articles, patents, etc.. Conducting reviews of relevant literature can be carried out at various levels of sophistication. The options include manual searching of printed material, computer online searching of a single source and online searching of multiple sources. Manual searching is the basic building block of literature review technique and should be a part of every student's experience. In chemistry and related disciplines, these searches are usually limited to one abstracting source such as Chemical Abstracts. In general, this type of search approach is utilized by students for course work or research projects. Their immediate need of producing a report can usually be satisfied but the student may miss much of the available information. This situation can be tremendously improved by searching a single database online, however the variety of information accessed and the extent of review presented is still limited.

A more thorough review would be expected to include a wide variety of references which might be indexed in completely different databases. Manually searching a variety of indexes is impractical. However, computer-based searching through a commercial online database provider opens up access to over 300 databases, including Chemical Abstracts. Databases range from Ageline to Zoological Record Online. A list of chemically related databases can be found on page 43 of this manual. Many variations with an interactive search strategy can lead to a more complete understanding of the subject matter than a minimum effort manual or online search of a single abstracting service.

In this age of complex interactions between different disciplines, interactive database searching may stimulate creative thoughts and certainly will enable more complete presentation of scientific work.

The intent of this instructional manual is to enable students to conduct computer-based interactive searching through multiple databases.

CHAPTER II
INTRODUCING STUDENTS TO INTERACTIVE DATABASE SEARCHING

The process of interactive searching is multifaceted, involving practice on the use of a computer, modem, software and telecommunications networks. More importantly, it helps to teach organization, logic and in-depth understanding of the subject and a competent, efficient use of the library. The introduction and development of these skills in the university setting could be accomplished in several ways. Many departments have specific courses which introduce students to the literature of their discipline. Our experience has been that students tend to take these courses late in their program of study, therefore missing out on the advantages of the searching techniques. If these literature courses were required during a student's sophomore year or early in their junior year, then introduction to the interactive searching techniques could be utilized for several years before graduation. A different approach would be to have a course segment available to instructors. This course segment would introduce students to the techniques in a more or less self-paced presentation. The instructional segment could then be used in any course that the instructor deemed appropriate, even a course specifically aimed at the literature of a discipline.

We have favored the latter approach because of its general applicability. This manual presents a course segment developed during a pilot program in the Chemistry Department at CSU Chico.

This manual will be available as an online text document in late February 1991. It will be accessible via anonymous FTP at cscihp.ecst.csuchico.edu (132.241.1.2) and will be found in the pub/chemistry directory. Information on anonymous FTP can be found on pages 31 and 53.

CHAPTER III
PROS AND CONS OF COURSE SEGMENT APPROACH

As the course segment was being developed many benefits of implementing instruction in this way were discovered. Also, several frustrations were encountered. These are illustrated below.

Pros

1. The quality and thoroughness of student reports improve as the students develop the tools necessary to perform their own interactive search. The integration of searching skills with a student's current interests (research papers, senior seminar, literature courses, advanced courses, undergraduate and graduate research) provides incentive for more enthusiastic and effective learning.

2. Organization and logic skills of students increase as they learn about preparedness. They quickly discover that the online database is not magical. The computer does not know what their project is or what information they need. They learn to think logically to prepare a strategy offline and then perform the search online. The search should be evaluated, amended and the process repeated until the results are satisfactory. This process is enhanced as the students make judicious use of the limited online time available.

3. The dynamic nature of scientific work is illustrated. The students are exposed to the enormous amount of literature available and learn how difficult (and important) it is for a researcher to stay current in a given discipline. An example is a student who was enrolled in an independent research project. He conducted a search (similar to lesson 5) as background to his research project. He was very disappointed to find that his project had already been done. He immediately read the relevant papers and was back the next day with an idea. After reading about the synthesis that had been done he had a modification in mind that would make the process more efficient. He couldn't wait to get to work!

4. More library services are utilized as students easily find many relevant literature references. Online searching provides modern journal references, but the students still have to find and evaluate the articles and write reports based on them. Older references are not found online and have to be found by traditional search techniques and/or references from modern articles. After an online database search the students know what literature is relevant. A subsequent online search indicates what journals and books are immediately available in our library. For those references which are unavailable locally, additional searches can be performed to identify institutions where the references are available. For instance, our students have utilized TELNET to access the University of California Online catalog (MELVYL) to find if articles unavailable at Chico can be found at U.C. Davis.

5. The course segment is easy to implement. With a multi-database vendor the only requirement to implement such a program is a telecommunications workstation consisting of a computer, printer, modem, telecommunications software, phone line, database account and password. Because the material is more or less self-taught, instructors from a variety of courses can ask their students to learn these techniques. The specific lessons can be tailored to a particular course.

6. The computer-based nature of the course segment enhances computer literacy. An expectation for college students, particularly in the sciences, should be computer literacy. Our program helps to acquaint students with basic computer operation, telecommunications software, use of a modem, logon/logoff to databases and networks, electronic mail and an introduction to networking.

7. The searching lessons can be adapted to other disciplines. Many of the lessons developed are adaptable to all disciplines with just a slight change in wording. Almost any subject will have an online information bank to access.

Cons

1. The instructor must be reasonably comfortable with computers and modems.

2. The actual abstract from Chemical Abstracts is not available through multi-database vendors other than STN the database vendor for CAS Online. An abstract is a wonderful device for initial evaluation of an article and it is an annoyance not to have it online. This problem is not insurmountable because the abstract number is given as a result of a search on a multi-database system and it can be looked up in the hardbound edition of Chemical Abstracts. Details on the conflict between Dialog, a multi-database vendor, and Chemical Abstracts Service that leads to this condition are available.[3]

3. Lack of availability of some journals. This is dependent on the periodical and book holdings of the library and the specific budgetary priorities of a given campus. See special notes on page 7 for suggestions on obtaining journal articles.

4. Security considerations. Online database time is relatively expensive and the potential for theft exists. See the special notes on page 7 for suggestions regarding database security.

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[3]See *Chem. and Eng. News* 68(25):4; 68(27):5 (1990)

CHAPTER IV
GETTING STARTED

This manual contains instructions and the actual lessons developed during a pilot program in the Department of Chemistry at CSU Chico. The program was used in conjunction with three upper division chemistry classes—Physical Chemistry Laboratory, Basic Instrumental Analysis, and Toxicology. Lessons were tailored to these classes.

The segment formally consists of 8 lessons; each require approximately 10 minutes offline preparation and 10 minutes online searching. A particular lesson may require more or less time. Additional lessons may be developed or assigned by the specific instructor. Following our format, students schedule 15 minute blocks of time for database access.

All of the lessons have "chemistry" as the common theme, but can be adapted to other disciplines with just slight changes in wording. The exceptions to this are lessons 4,5 and 7 which are strictly chemical in nature. Lesson 2 deals with online access to the Meriam Library at CSU Chico. This lesson will be most useful to other CSU campuses which have the "Catalog Plus" online card catalog.

Computer workstations used

1. Computer: IBM compatible, XT(or higher) or Macintosh SE
2. Printer: dot matrix is sufficient
3. 1200-2400 baud modem
4. Telecommunications software: Procomm™, Red Ryder™ or similar
5. Phone line
6. Database account and password: available through the database vendor.

The number of workstations needed depends on the number of students served. This manual illustrates a series of short lessons that maximize development of searching technique but minimize time on the database. Our short lesson method allowed one workstation to serve 12-20 students.

CHAPTER V
THE DATABASE VENDOR

Online database searching in the sciences has many common features. The user must first organize for the search by collecting keywords, authors, and other information which may be discipline specific. For example, chemistry uses registry numbers and molecular weights. The user must have a working knowledge of Boolean Logic (discussed later) and then must physically connect with the database provider. Once online the user must be able to interact with the database by knowing the command language. This manual illustrates and instructs in the use of DIALOG™ and its commands. There are other providers with similar capabilities and command languages. We chose DIALOG™ because of the many database available[4] and the special rates of the Classroom Instructional Program (CIP™). This manual could be adapted for use with another vendor.

[4]See DIALOG™ chemically related database descriptions on page 43 of this manual

CHAPTER VI
SPECIAL NOTES

1. The lack of some journals at a library can be overcome several ways. Our students utilized inter-library loan which can be amazingly swift but usually is quite slow. A second solution involves using a service of the database vendor called DIALORDER™. The document providers found in the DIALOG™ Yellow Sheets can provide any document. DIALORDER™ is quite expensive and beyond our current budget.

2. Expensive database time is secured because access to the database is password protected. However, it is inconvenient to require the instructor to do the logons. It is more natural to have each student logon and logoff from a given online session. We protect our system by programming the password into macro keys within the telecommunications software (this is very easy to do). We give each student a protocol for logging on and off to DIALOG™ (see page 45 of this manual) which sends the necessary commands to the database provider. The password is never seen on the screen. Students can only access the database during their scheduled session.

This is a simple approach to security. A person familiar with the telecommunications software can easily enter a command to see the makeup of the macro keys! We keep this possibility to a minimum by maintaining the software with encoded password on a floppy disk not on the hard disk. The floppy is removed from the laboratory after every session and kept in a secure place. The password can be changed if there is any breach in security.

CHAPTER VII
REFERENCE MATERIAL

The students mainly use the handout material we provide. In addition the following reference material is available:

Searching DIALOG: The Complete Guide[5] - The basic reference manual for using the DIALOG system. Detailed explanations on how to access DIALOG and on each of the commands and features are included. It also includes a set of Bluesheet searching guides for each database and a set of Yellowsheets detailing the prices and policies of DIALORDER™ document delivery suppliers.

Searching DIALOG: The Tutorial Guide[5]- This is a self-paced instructional manual with examples, summaries and hands-on exercises.

Database Documentation Chapters[5]- A separate documentation chapter is available for most databases. Each chapter is about 40 pages long and includes sample searches, searchable fields and a list of available search aids. We have Analytical Abstracts, CA Search, Chemname, Heilbron and Biosis Previews.

CA Headings Lists[6] - Includes the list of controlled vocabulary headings for: 1) General subject index headings of the 9th, 10th, and 11th Collective Index periods and 2) Plant and Animal headings for the 9th, 10th, and 11th Collective Index periods.

Naming and Indexing of Chemical Substances for Chemical Abstracts[6] reprint of Appendix 4 of the 1987 Index Guide.

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[5]Available from DIALOG Information Services, Inc., 3460 Hillview Avenue, Palo Alto, CA 94304, Telephone 800-3DIALOG

[6]Available from Chemical Abstracts Service, P.O. Box 3012, Columbus, OH 43210, Telephone 614-447-3600

CHAPTER VIII
WEEKLY PROCEDURES AND LESSONS

This chapter introduces the short lesson method we developed which enabled our students to search multiple databases via Dialog™. The lessons and subsequent assignments shown on the following pages were given to our students.

Students were always given a lesson one week prior to their searching laboratory. This procedure coupled with the limited online time available established good habits—they came prepared to work.

Week 1
An introduction/overview should be given. This should include a lecture and an online demonstration of a predetermined database search. A printed copy of the demonstration search should be given to each student because it is so easy to miss details on the screen of a computer monitor.

A handout on the basics of online searching should also be distributed at this time. This handout should contain general information to be used as a reference while preparing search strategies offline. The handout used in our project can be found on page 34 of this manual (Chapter IX).

Lesson 1 should be handed out at this time. The procedure for the student searching laboratory needs to be discussed in detail. The details of the laboratory will vary depending on the physical layout, number of workstations (computer/modem/phone line/password) and availability of instructors. In our case, with one workstation, the students signed up in advance for blocks of time (15 minute blocks); the searching laboratory was always supervised so additional help and instruction was available. We required that the lesson be read in advance and online strategy be planned in advance or the student could not attempt the lesson. After the students finished their search they left the laboratory with a hard copy of their session to be handed in to their instructor.

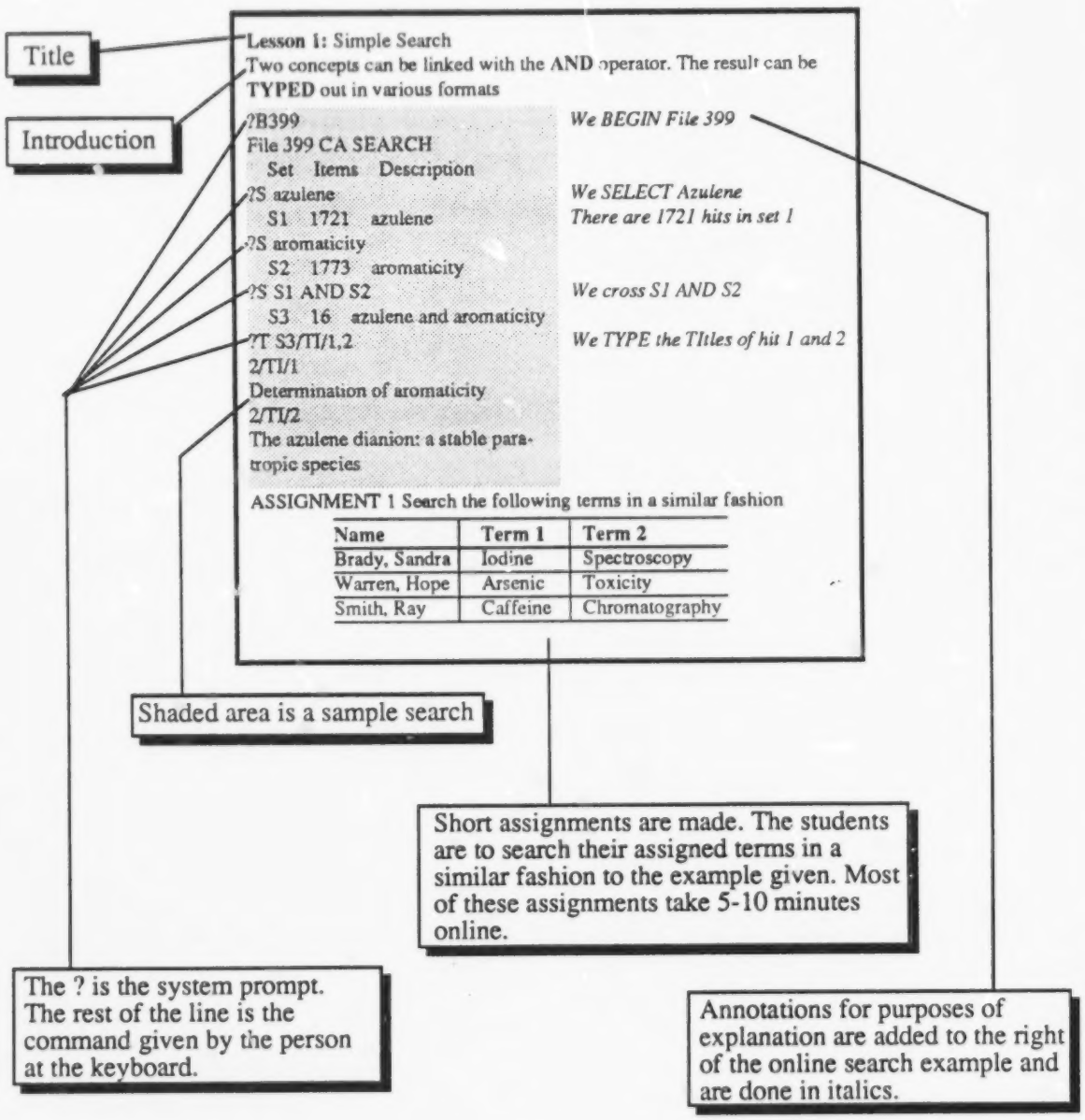
Week 2
Lesson 1 is done by the students in the supervised laboratory. At this time the students are shown how to access the database vendor via computer and modem and how to choose a particular database (File) with the **BEGIN** command. This lesson uses File 399 which is Chemical Abstracts Search. The lesson also illustrates how to **SELECT** a keyword, **Limit** the number of references received ("Hits") and **TYPE** the results. The data collected online is "echoed" to a dot matrix printer for the student and also stored as a text file for future instructor reference.

At this time the students receive Lesson 2 which will be performed in the same fashion the following week.

The next page in this manual is entitled "How to interpret lessons" and should be read thoroughly before proceeding to Lessons 1-8.

How to interpret Lessons

Lessons 1-7 follow a similar format. They start with a title followed by an introductory paragraph. Next comes an annotated sample online search followed by assignments for the students. All lessons trace the assignments of 12 students through a semester. Lesson 8 has a different format that is explained within the lesson.


Title
Introduction
Lesson 1: Simple Search
Two concepts can be linked with the AND operator. The result can be TYPED out in various formats
?B399
File 399 CA SEARCH
Set Items Description
?S azulene
S1 1721 azulene
?S aromaticity
S2 1773 aromaticity
?S S1 AND S2
S3 16 azulene and aromaticity
?T S3/TI/1,2
2/TI/1
Determination of aromaticity
2/TI/2
The azulene dianion: a stable para-tropic species
We BEGIN File 399
We SELECT Azulene
There are 1721 hits in set 1
We cross S1 AND S2
We TYPE the TItles of hit 1 and 2
ASSIGNMENT 1 Search the following terms in a similar fashion
Name | Term 1 | Term 2
Brady, Sandra | Iodine | Spectroscopy
Warren, Hope | Arsenic | Toxicity
Smith, Ray | Caffeine | Chromatography
Shaded area is a sample search
Short assignments are made. The students are to search their assigned terms in a similar fashion to the example given. Most of these assignments take 5-10 minutes online.
The ? is the system prompt. The rest of the line is the command given by the person at the keyboard.
Annotations for purposes of explanation are added to the right of the online search example and are done in italics.

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Lesson 1: Simple Search with Limitations

Two concepts can be linked with the **AND** operator. As can be seen in the sample search below this type of linkage can give a very large number of hits. Often you will append suffix codes to limit the search.

```
? B 399                                  We BEGIN File 399

File 399: CA SEARCH 1967-1989
    Set  Items  Description
     ---  ------  -------------
?S BENZENE                               We SELECT Benzene
    S1  156175  BENZENE                  There are 156175 hits in Set 1
?S S1/FF                                 Limits words to full term i.e. not bromobenzene
    S2   49706  S1/FF                    Note the large reduction in hits
?S TOXICITY
    S3  101160  TOXICITY
?S S2 AND S3                             The two concepts are linked with AND
        49706  S2
       101160  S3
    S4     540  S2 AND S3               Too many hits to evaluate
?S S4/ENG                                /ENG limits to the English Language
    S5     324  S4/ENG                  Notice the reduction
?S S5/TI                                 Search terms must be in the TITLE
    S6     245  S5/TI
?S S6/1989:1990                          Limits to the Publication Years 1989-1990
         245  S6
      274167  PY=1989 : PY=1990
    S7      18  S6/1989:1990            There are only 18 recent articles
?T S7/TI/ALL NOHEADER                    We TYPE All Titles of Set 7 with no headings
```

Prevention of benzene-induced myelotoxicity by nonsteroidal anti-inflammatory drugs

Studies on the mechanism of benzene toxicity

Differences in the pathways for metabolism of benzene in rats and mice simulated by a physiological model

Mechanisms of free radical chemistry and biochemistry of benzene

QSAR investigation of benzene toxicity to fathead minnow using molecular connectivity

Peroxidase-dependent metabolism of benzene's phenolic metabolites and its potential role in benzene toxicity and carcinogenicity

Metabolism and toxicity of trans,trans-muconaldehyde, an open-ring microsomal metabolite of benzene

The effect of dose, dose rate, route of administration, and species on tissue and blood levels of benzene metabolites

Benzene, an experimental multipotential carcinogen: results of the long-term bioassays performed at the Bologna Institute of Oncology

Prevention of benzene-induced myelotoxicity and prostaglandin synthesis in bone marrow of mice by inhibitors of prostaglandin H synthase

Modulation of benzene toxicity by polyinosinic-polycytidilic acid, an interferon inducer

Macrophage regulation of myelopoiesis is altered by exposure to the benzene metabolite hydroquinone (Erratum to document cited in CA110(23):207357g)

Structure-activity relationship studies on the toxicity of benzene derivatives: III. Predictions and extension to new substituents

Macrophage regulation of myelopoiesis is altered by exposure to the benzene metabolite hydroquinone

Cytotoxic effects on benzene on mouse germ cells determined by flow cytometry
Inhibitory effect of benzene metabolites on nuclear DNA synthesis in bone marrow cells
The role of GSH depletion and toxicity in hydroquinone-induced development of enzyme-altered foci
The prevention of benzene-induced genotoxicity in mice by indomethacin

ASSIGNMENT 1 Search the following terms in a similar fashion:

Name	Term 1	Term 2
Brady, Sandra	Iodine	Spectroscopy
Burgess-Henry, Jana	Iodine	Photoelectron and Spectroscopy
Schlais, Scott	Iodine	Recombination
Warren, Hope	Iodine	Rotation
Wood, Michael	Iodine	Resonance
Ehorn, William	Nitrate	Determination
Fox, Michael	Nitrate	Toxicity
Hansen, Janet	Uranium	Toxicity
Harrison, Katherine	Caffeine	Chromatography
Howard, Sean	Caffeine	Reverse Phase and Chromatography
Laurie, Greg	Laser	Solid State
Smith, Ray	Laser	Diode

SEARCH DETAILS:

1. Search the terms listed above. Type the titles (maximum of 10) with the NOHEADER command.

Week 3

The pattern established earlier is followed for subsequent lessons. Certain lessons may require additional time and activities for the students.

Lesson 2 begins with a sample search that is very similar to the search in Lesson 1 and introduces the use of database **fields**. The final result of this search is a bibliographic citation of a periodical and is listed as **Energy Convers. 1968 Volume 8 Number 3 Pages 113-15**. The students are then asked a very important question **"Do we have this journal?"**. If a title is obtained from an online search seems important it is necessary to know if our library carries this journal and has the requisite volume. Lesson 2 requires the student to locate online (via the Meriam Library's "Catalog Plus") a call number and library holdings of an assigned periodical. The full titles of the periodicals are not known to the students and this lesson introduces **truncation** to retrieve variations in word endings. The student is also required to describe how this process is done using traditional library techniques and to identify the full name of a given abbreviated periodical using the hardbound Chemical Abstract Service Source Index. These assignments (both online and offline) are designed to familiarize the student with the library and to prepare them with the inevitable use of inter-library loan.

Note: The online card catalog format is different than that of Dialog™. In the following lesson *Italic print* is annotation, normal print is the online library output and **bold print** is the keyboard entry to a library system prompt.

Lesson 2: Journal Location at Meriam Library via Catalog Plus

Consider the following search in File 399:

```
? B 399
File 399: CA SEARCH 1967-1989
        Set     Items     Description
        ---     ------    -------------
? S FUEL CELLS                                  We SELECT the phrase "fuel cells"
        S1      8375      FUEL CELLS            There are 8375 hits in Set 1
? S CS=NASA                                     CS= finds the "corporate source"
        S2      10732     CS=NASA               Set 2 has 10732 hits
? S S1 AND S2                                   We link the two concepts with AND
                8375      FUEL CELLS
                10732     CS=NASA
        S3        41      S1 AND S2
? T S3/6/1                                      We TYPE the first article in format 6

  2/6/1
71008943   CA: 71(2)8943w   JOURNAL             Format 6 gives title and citation
 Effect of oxygen-supply impurities on the performance
 of a hydrogen-oxygen fuel cell
 AUTHOR(S): Jones, Jesse Claude; Cox, Jim E.
 LOCATION:NASA-MSC, Houston, Tex.               Notice the Corporate Source
 JOURNAL: Energy Convers.  DATE: 1968           Do we have this journal??
 VOLUME: 8 NUMBER: 3  PAGES: 113-15
```

To find out the answer to this question you LOGOFF from DIALOG™ and LOGON to the Meriam Library Online Catalog (Catalog Plus) at CSU Chico. In the following example some student familiarity with the Online Catalog is assumed. For additional information see "Catalog Plus Remote Access Guide" and "Catalog Plus"[7]. The process is as follows.

1. LOGON to Catalog Plus (see Library LOGON Instructions)
2. Choose Search Category 4 which is "All Categories"
3. Use T= (Title), $ (Truncation), FOR=SER (Format = Serials) and Boolean Logic
4. Search by Keyword
5. When prompted about truncation possibilities, use A (All) unless you are sure!

EXAMPLE:

SEARCH TERM(S): **T=ENERGY AND T=CONVERS$ AND FOR=SER**

CONVERSACION(2)	CONVERSACIONES(0)	CONVERSATION(3)
CONVERSATIONAL(10)	CONVERSATIONS(20)	CONVERSIONS(1)
CONVERSE(20)	CONVERSING(0)	CONVERSION(5)

The Words Listed Above Match Your Search Term(s). Select
the Term(s) You Wish to Include, Then Press RETURN.m

PRESS YOUR CHOICE: A to Select All Words. *We select A to include*
NEXT Word. S to Select a Word. *all choices*

---

[7]See pages 45 – 47 of the manual for these two documents

PREVious Word. E to Eliminate a Word.

SEARCH TERMS REFERENCES FOUND
1. T=ENERGY AND T=CONVERS$ AND FOR=SER 4

Press Line Number for Brief References. **1**

BRIEF REFERENCES
SEARCH TERM(S): T=ENERGY AND T=CONVERS$ AND FOR=SER

NO.	TITLE	DATE	FORMAT
1.	Advanced energy conversion	1961	SERI
2.	Energy conversion	1968	SERI
3.	Intersociety Energy Proceedings	1966	SERI
4.	IEEE transactions on energy conversion	1986	SERI

Press Line Number to Select Your Choice: **2**

CALL NO.: TK2896 A48 (Periodicals)
TITLE: Energy conversion. *Yes, we have the journal!!*
PUB INFO: v. 8- Aug. 1968-
CHICO HAS: v.8-14,1968-75.

ASSIGNMENT 2 Search Journal 1 names in a similar fashion:

Name	Journal 1	Journal 2
Brady, Sandra	Adv. Alicy. Chem.	Alger Sci. Phys.
Burgess-Henry, Jana	Adv. Clin. Chem.	Aliment. Anim.
Schlais, Scott	Adv. Hetero. Chem.	Allergol. Immunopathol. Suppl.
Warren, Hope	Chem. Commun.	Allg. Text. Z.
Wood, Michael	Chem. Depend.	Anal. Chim. Acta
Ehorn, William	Chem. Geol.	Analecta Vet.
Fox, Michael	Aust. J. Chem.	Analg. Anaesth. Perinatol.
Hansen, Janet	J. Chem. Phys.	Anal. Khim. Ekstra. Protsessy
Harrison, Katherine	Clin. Chem.	Anal. Microbiol.
Howard, Sean	Chem. Week	An. Ars Med.
Laurie, Greg	Coord. Chem. Rev.	An. Asoc. Quim. Argent.
Smith, Ray	Chem. Formu.	An. Asoc. Quim. Farm. Urug.

QUESTIONS:
1. What is the call number of your assigned journal? (Journal 1)
2. What volumes of the assigned journal does our library have? (Journal 1)
3. How can this process be done manually (off line) in the library? Be specific, include names and locations.
4. Suppose you need to get a journal article via inter-library loan. The ILL form requires a complete journal name. You only know the abbreviation from a Chem. Abstract bibliographic citation. There is a book in the library that will help you. What is its name and where is it located? What is the complete name of your Journal 2 ?

N.B. The answers to 3 and 4 can be gotten from a reference librarian. When in doubt in the library, ASK!

Week 4
Lesson 3 is particularly important. While online, students are often at a loss for words (particularly important keywords). The **EXPAND** command can often help them find the correct word or phrase. They are also introduced to the concept of literature search by **key author**. They investigate the online ability to expand a term to indicate **Related Terms**. These related terms can be further expanded until the desired term is revealed.

Lesson 3: Viewing Database Indexes via the EXPAND Command

Any portion of the basic index or the additional indexes can be viewed with the EXPAND command. The result is an alphabetical listing of terms. These terms can be selected from the display rather than keyed in. EXPAND is useful to provide the searcher with suggestions for spelling and alternate forms of the search term.

EXAMPLE 1: What has John O. Edwards published?

```
? E AU=EDWARDS, JOHN O.                    The Author Field (AU=) is expanded

Ref    Items  Index-term
E1         1  AU=EDWARDS, JOHN M.
E2         7  AU=EDWARDS, JOHN MICHAEL
E3        54  *AU=EDWARDS, JOHN O.         E3 is always the term you keyed in
E4        33  AU=EDWARDS, JOHN OELHAF
E5         3  AU=EDWARDS, JOHN ORMEROD
E6         2  AU=EDWARDS, JOHN P.
E7        24  AU=EDWARDS, JOHN R.
E8         3  AU=EDWARDS, JOHN RICHARD
E9         9  AU=EDWARDS, JOHN S.
E10        2  AU=EDWARDS, JOHN VICTOR
E11        1  AU=EDWARDS, JOHN W.
E12        2  AU=EDWARDS, JOHN WILLIAM

?S E3                                      The third term is and converted into
   S4  54     AU="EDWARDS, JOHN O."          a set (S4) which can be logically linked
                                             or printed out
```

EXAMPLE 2: What is another term for enthalpy? Can we be more specific?

```
?E ENTHALPY                                We EXPAND the word enthalpy
Ref    Items   RT  Index-term
E1         2       ENTHALPOMETRIC
E2         1       ENTHALPRES
E3     15742   5   *ENTHALPY               Enthalpy has 5 Related Terms (RT)
E4         0   1   ENTHALPY-ENTROPY CURVE
E5         1       ENTHALPY-EXERGY DIAGRAM
E6         1       ENTHALPY,APPARENT MOLAR
E7         1       ENTHALPY,APPARENT       All of these are subcategories and
E8         1       ENTHALPY,BALANCE          included in the general term enthalpy
E9         2       ENTHALPY,CONFIGURATIONAL
E10        1       ENTHALPY,CONFORMATIONAL
E11        0   1   ENTHALPY,ENTROPY RELATIO

?E E3                                      We EXPAND the Ref of interest
```

Ref	Items	Type	RT	Index-term	
R1	15742		5	*ENTHALPY	*The 5 Related terms are listed*
R2	5274	R		HEAT OF ADSORPTION	
R3	4844	R	7	HEAT OF DISSOCIATION	*The related terms can have related terms*
R4	3426	R	4	HEAT OF REACTION	
R5	8	R		ISENTROPIC EXPONENTS	
R6	0	N		ENTHALPY FUNCTION	

?E R4 *These can be further EXPANDED*

Ref	Items	Type	RT	Index-term
R1	3426		4	*HEAT OF REACTION
R2	38	R		HEAT OF CHLORINATION
R3	11663	R	2	HEAT OF FORMATION
R4	404	R		HEAT OF HYDROLYSIS
R5	376	R	1	HEAT OF OXIDATION

EXAMPLE 3: Is NASA a suitable abbreviation to search?

?E CS=NASA *We expand the Corporate Source Field*

Ref	Items	Index-Term	
E1	17	CS=NARZEDZIOWEGO	
E2	70	CS=NAS	
E3	10732	CS=NASA	*Yes, NASA is a good search term*
E4	1	CS=NASAKA	
E5	1	CS=NASAKI	
E6	1	CS=NASAL	

ASSIGNMENT 3 Expand the following terms in a similar fashion:

Name	Term 1	AU=
Brady, Sandra	Adiabatic	Harris, C.B.
Burgess-Henry, Jana	Thermochemistry	Zewail, Ahmed H.
Schlais, Scott	Paramagnetic	Barbara, Paul F.
Warren, Hope	Cryoscopic	Herzberg, G.
Wood, Michael	Dynamics	Eigen, M.
Ehorn, William	Electrochemical	Weaver, Michael J.
Fox, Michael	Spectrometry	Strobel, Howard A.
Hansen, Janet	Potentiometry	Wightman, R. Mark
Harrison, Katherine	Conductivity	Sawyer, Donald T.
Howard, Sean	Photoluminescence	Fawcett, W.R.
Laurie, Greg	Scintillation	Griffiths, Peter R.
Smith, Ray	Absorption	Cram, Donald

Search Details:

1. For AU=, select all entries that seem correct then type a few (maximum 10) titles. From these titles select one and type it in Format 5 (Full Format).

2. Expand the other term in the Basic Index. Examine a few related terms.

Week 5

This lesson introduces the students to other databases than CA Search (file 399). They will discover the nonbibliographic databases such as **Heilbron** and **Chemname** and the phenomenal amount of information they contain. The concept of **Registry Number Search** is introduced. They learn that the **MAP** command stores registry numbers for subsequent use in other databases.

Lesson 4: Registry Numbers, Heilbron (File 303), Chemname (File 301), MAP RN TEMP

Chemical nomenclature can be very complicated. There are trivial names, IUPAC names, CA names, Trade Names and other names. Registry Numbers were created to avoid some of the problems associated with multiple chemical names. There is a different Registry Number for each unique chemical compound and RN= is a searchable field in CA Search (File 399). Registry Numbers are unique random number combinations that cannot be deduced from chemical structure and must be looked up.

EXAMPLE 1: What is the Registry Number of bromine?

Registry Numbers can be obtained from the Merck Index. For example the number for bromine is found to be 7726-95-6. Registry Numbers can also be found in some commercial chemical catalogs (Aldrich, Kodak, K & K Labs, P & B, Spectrum Chemicals).

EXAMPLE 2: Registry Numbers Online

Several nonbibliographic databases have Registry Number indexes. These include Kirk-Othmer Online (File 302), Heilbron (File 303), Merck Index Online (File 304) and Chemname (301). **Chemname is the database of choice for nonbibliographic data including Registry Number, Molecular Formula, Ring System Data, and nomenclature.** The others listed above have more detailed information and can be very valuable but they have fewer citations. A Chemname (301) search is shown below. A Heilbron (303) search for the chemical described by the trade name Xylocaine is shown as a second search.

CHEMNAME (301):

```
?B 301                                          We BEGIN Chemname
File 301:CHEMNAME
?S CARBROMAL                                    We SELECT Carbromal
  S2    1     CARBROMAL
?T S2/5/1                                       We TYPE in Format 5
 2/5/1
CAS REGISTRY NUMBER: 77-65-6                    The Registry Number is given
 FORMULA: C7H13BrN2O2
 CA NAME(S):
  HP=Butanamide (9CI), SB=N-(aminocarbonyl)-2-bromo-2-ethyl-
  HP=Carbromal
 OTHER CA NAMES:
  HP=Urea (8CI), SB=(2-bromo-2-ethylbutyryl)-
 SYNONYMS: .alpha.-Ethyl-.alpha.-bromobutyrylurea;
     (.alpha.-Bromo-.alpha.-ethylbutyryl)carbamide;
     (.alpha.-Bromo-.alpha.-ethylbutyryl)urea; Adalin;
     Bromacetocarbamide; Bromadal; Bromdiethylacetylurea;
     Bromodiethylacetylcarbamide; Diacid; Dormiturin; Hoggar; Karbromal
     ; Kartryl; Nenesin; Nyctal; Parkosed; Pelidorm; Planadalin; Tildin
     ; Uradal; 2-Bromo-2-ethylbutyrylurea

 ?MAP RN TEMP                                   MAP stores the Registry Number
serial#TB022                                    This codes (TB022) the information

?B 399                                          We BEGIN CA SEARCH
```

File 399:CA SEARCH
?EXS TB022 *And recall the RN that were stored*
S1 190 RN=77-65-6
?S S1 AND TOXICITY *Link RN with toxicity*
190 S1
101160 TOXICITY
S2 6 S1 AND TOXICITY
?S S2/ENG,NPT *Limit to English and nonpatent*
S3 2 S2/ENG,NPT
?T S3/TI/ALL NOHEADER *Print titles without headers*
Cardiotoxic actions of bromisoval and carbromal
Comparison of bromisoval and carbromal in the rat

HEILBRON (303):
?B 303
File 303:HEILBRON
?S XYLOCAINE *The synonym is selected*
S3 1 XYLOCAINE
?T S3/5/1 *Typed in Format 5 (Full Format)*
3/5/1
0051791 Heilbron Acc No: L-00307
Subfile: Dictionary of Organic Compounds, 5th Edition, Main Work, 1982
Heilbron Name: Lignocaine: BAN
Synonyms: 2-(Diethylamino)-N-(2,6-dimethylphenyl)acetamide;9CI;
2-(Diethylamino -2',6'-acetoxylidide; 8CI ; N-Diethylaminoacetyl-2,6-di methylaniline; Lidocaine; INN ; Broncaine; Xylocaine; Lignocaine,Numerous proprietary names *Notice all the names!*
CAS Registry No: 137-58-6 ***But only one registry number!***
Formula: C14H22N2O
Weight: 234.341
Compound Type: Anaesthetics, local, Antiarrhythmic agents *Lots of other info mation too*
Use/Importance: Local anaesthetic, antiarrhythmic agent.
State: Needles (C6H6 or EtOH)
Mp: 68-69 deg C
Bp: 180-182 deg C at 4 mm
References:
Harms, A.F. et al, J. Med. Chem., 1961, 4, 575; synth,pharmacol *References too!*
Garland, W.A. et al, Biomed. Mass. Spectrom., 1974, 1, 124; ms
Jones, R.L., J. Pharm. Sci., 1974, 63, 1170; ir
Yoo, C.S. et al, Acta Crystallogr.Sect.B,1975, 31,1354;cryst struct
Goto, S. et al, Yakugaku Zasshi, 1979, 99, 146;
Singh, S.P. et al, Spectrosc. Lett., 1979, 12, 95; nmr

ASSIGNMENT 4: MAP RN TEMP of Substance in Chemname then logically link (and) with Term in CA Search

Name	Substance	Term
Brady, Sandra	Saccharine	Toxicity
Burgess-Henry, Jana	Aspartame	Toxicity
Schlais, Scott	9-Amino-6-chloro-2-methoxyacridine	Fluorescence
Warren, Hope	9,10-Dihydro-10-methylacridine	Fluorescence
Wood, Michael	Mercury	Toxicity
Ehorn, William	Malachite Green Leucocyanide	Spectroscopy
Fox, Michael	9-Diazofluorene	Spectroscopy
Hansen, Janet	4-Amino-4'-cyanobiphenyl	Fluorescence

Harrison, Katherine	Benzoquinuclidine	Fluorescence
Howard, Sean	Diphenyldiazomethane	Fluorescence
Laurie, Greg	4-Nonanolide	Spectroscopy
Smith, Ray	p-(Dimethylamino)benzonitrile	Fluorescence

Week 6

A chemist must be able to perform a literature search that deals with synthesis. The lesson done this week will prepare students for this inevitability. The lesson introduces the online **Appending** of the letter p (for "preparation") to the registry number to use for a direct route to preparation articles. The lesson introduces further limitation on article retrieval by **Suffix Codes** such as **NPT** (nonpatent), **ENG** (English language only) and **FF** (full word only).

In this lesson the students are asked to print and examine a number of titles of articles while online. They learn telecommunications software commands to quickly **redisplay** output that has scrolled off the screen of the monitor.

Lesson 5: Locating Preparation (Synthesis) Articles

Many chemical literature searches are applied to synthetic research. You can select and logically link terms such as S RN=58-08-2 AND PREPARATION but it is easier to append a P (for preparation) to a registry number in the following fashion: S RN=58-08-2P.

Chemname (File 301) can be used to determine Registry Number(s) and the "P" can be automatically appended and these numbers can be MAPPED as seen in the following example that deals with synthesis of the antiviral agent AZT.

```
?B 301
File 301:CHEMNAME
?S SY=AZT                                   Select the synonym AZT
     S1      1  SY=AZT
?T S1/5/1
 1/5/1
CAS REGISTRY NUMBER: 30516-87-1             The RN= is given
  FORMULA: C10H13N5O4
  RING SYSTEM DATA:
    (01) (nr=01; sr=5; ar=C4O.01; fr=OC4.01; ir=16-138-1)
    (01) (nr=01; sr=6; ar=C4N2.01; fr=NCNC3.01; ir=46-195-28)
  CA NAME(S):
    HP=Thymidine (8CI 9CI), SB=3'-azido-3'-deoxy-
  SYNONYMS: Azidothymidine; AZT; AZT(pharmaceutical);
BW-A 509U; Retrovir; Zidovudine; 3'-Azido-3'-deoxythymidine;
3'-Azidothymidine; 3'-Deoxy-3'-azidothymidine

?MAP RN TEMP/"P"                            This appends a P and MAPS (Stores)

1 select statement(s)
serial#TB026                                This code number recalls the RN's

?B 399                                      We shift to CA Search
 File 399:CA SEARCH
?EXS TB026                                  EXECUTE the MAPPED Numbers
     S1      19  RN=8066-44-2P              There are 19 hits
?S S1/NPT,ENG                               Limit to English and nonpatent
```

S2 8 S1/NPT,ENG
?T S2/TI/ALL NOHEADER *Type titles without headers*

5-Chloro-substituted derivatives of 2',3'-didehydro-2',3'-dideoxyuridine,3'-fluoro-2',3'-dideoxyuridine and 3'-azido-2',3'-dideoxyuridine as anti-HIV agents
Methyl 5-O-tert-butyldiphenylsilyl-2-deoxy-.alpha.,.beta.-D-threo-pentofuranoside as a divergent intermediate for the synthesis of 3'-substituted-2',3'-dideoxynucleosides: synthesis of 3'-azido-3'-deoxythymidine, 3'-deoxy-3'-fluorothymidine and 3'-cyano-3'-deoxythymidine .
.alpha.,.beta.- and .beta.,.gamma.-Methylene 5'-phosphonate derivatives of 3'-azido-2',3'-dideoxythymidine-5'-triphosphate. Correlation between affinity for reverse transcriptase, susceptibility to hydrolysis by phosphodiesterases and anti-retrovirus activity
Methyl 5-O-tert-butyldiphenylsilyl-2-deoxy-D-threo-pentofuranoside; an approach to the synthesis of 3'-substituted-2',3'-dideoxynucleosides including 3'-azido-3'-deoxythymidine and of 3'-substituted-2',3'-dideoxy-C-nucleosides
Inhibition of the reverse transcriptase from HIV by 3'-azido-3'-deoxythymidine triphosphate and its threo analog
Synthesis of 3'-azido-2',3'-dideoxyribofuranosylpurines
Nucleotide synthesis. IV. Phosphorylated 3'-amino-3'-deoxythymidine and 5'-amino-5'-deoxythymidine and derivatives
Synthesis of phosphorylated 3'-amino-3'-deoxythymidine and 5'-amino-5'-deoxythymidine

ASSIGNMENT 5 Begin Chemname, append P and search CA Search for:

Name	Substance
Brady, Sandra	Saccharine
Burgess-Henry, Jana	Aspartame
Schlais, Scott	9-Amino-6-chloro-2-methoxyacridine
Warren, Hope	9,10-Dihydro-10-methylacridine
Wood, Michael	Brompheniramine
Ehorn, William	Butamben
Fox, Michael	9-Diazofluorene
Hansen, Janet	4-Amino-4'-cyanobiphenyl
Harrison, Katherine	10-Thioxo-9(10H)-anthracenone
Howard, Sean	Diphenyldiazomethane
Laurie, Greg	4-Nonanolide
Smith, Ray	p-(Dimethylamino)benzonitrile

DETAILS:

1. /FF may be necessary in File 301 to find the parent compound.
2. TYPE titles with headers (omit NOHEADER command); maximum of 10.
3. Peruse these titles and TYPE one of them in format 5 (Full Format)

TELECOMMUNICATION SOFTWARE NOTE:

You have probably noted that the output from Dialog™ "scrolls" off the screen and only a portion is visible. Our telecommunications software is called Procomm™ and has a feature that lets you **redisplay** the last 10,000 characters that have come in. You may need this feature in step 3 above to peruse the titles.

To redisplay the characters that have scrolled off the screen, press **Alt F6**. You can move through the redisplay in several ways: use the **PgUp** and **PgDn** to scroll one page in either direction; use the **up and down arrow** to move one line in either direction. Pressing the

Home key will cause the first page of the buffer to display while pressing the **End** key will cause the last page to display.

Week 7

The lesson this week deals with multiple database searching. This is a very valuable tool to gather a maximum amount of information from a variety of sources in a minimum amount of time. The **REMOVE DUPLICATES** command is discussed. The ability to remove duplicate articles in a multiple database search can be very important. The lesson stresses **acronym searching** for the occasions in which it is unclear what database to use.

Lesson 6: DIALOG OneSearch™ (Multiple Database Searching)

Occasionally you will search topics that are somewhat unfamiliar. What is the best database to use in this situation? Good descriptions of all the databases can be obtained from the *DIALOG™ Database Catalog*. More detailed information on each database can be gotten from the "Bluesheets".

OneSearch™ is a feature that allows searching in up to 20 files concurrently with one search strategy. With OneSearch™ you may BEGIN the desired files (e.g. B 5,10,28) or use the convenient DIALINDEX™ Categories (e.g. B CHEMLIT). In the first example the search session would open to include BIOSIS PREVIEWS (File 5), AGRICOLA (File 10) and OCEANIC ABSTRACTS (File 28). In the latter example the acronym CHEMLIT stands for Chemistry Literature and includes Files 8,13,12,34,434,433,432,144,302,304,315,317,322,399. Combinations of the two options are also possible, for example B VETSCI,399,76 to add files to the category or to exclude a file from a category use B CHEMENG NOT 335.

Remember that a "File" represents data abstraction by a particular source. There can be quite a bit of crossover between Files i.e. you can get a lot of duplicate records when using OneSearch™. The command REMOVE DUPLICATES (RD) will remove duplicate postings from most (but not all) files.

Consult *DIALOG™ Database Catalog* and the appropriate Bluesheet(s) **before** you go online! You should always spend much more time in the offline planning of your search than the online execution.

EXAMPLE:

```
?B CHEMLIT                                    You BEGIN the category of choice
  File  8:COMPENDEX PLUS
  File 13:INSPEC
  File 12:INSPEC
  File 34:SCISEARCH
  File 434:SCISEARCH
  File 433:SCISEARCH
  File 432:SCISEARCH                          All the files in that category are listed
  File 144:PASCAL
  File 302:Kirk-Othmer Encyc of Chem Technology
  File 304:MERCK INDEX ONLINE
  File 315:CHEMICAL ENGINEERING ABSTRACTS
  File 317:CHEMICAL SAFETY NEWSBASE
  File 322:POLYMER ONLINE
```

File 399:CA SEARCH

Set	Items	Description
?S CAMPTOTHECIN		*Your search technique is the same as with a single database, you can SELECT, LIMIT, EXPAND etc.*
S3	447	CAMPTOTHECIN
?S S3/ENG,NPT,1987:1990		
	357	S3/ENG,NPT
	5195136	PY=1987 : PY=1990
S4	107	S3/ENG,NPT,1987:1990
?RD S4		*REMOVE DUPLICATES (RD) takes out all the duplicate postings*
S5	65	RD S4
?T S5/6/1		*Type the first hit in Format 6*
5/6/1 (Item 1 from file: 12)		*This indicates which file the information came from*

09855051 Number of References: 9
REVERSED-PHASE HIGH-PERFORMANCE LIQUID-CHROMATOGRAPHIC ASSAY FOR CAMPTOTHECIN AND RELATED ALKALOIDS

?T S5/6/15 — *Type the 15th hit*
5/6/15 (Item 15 from file: 434) — *Note that it is from a different file*
09359353 Number of References: 22
Structure-activity study of the actions of camptothecin derivatives on mammalian topoisomerase-i - evidence for a specific receptor-site and a relation to antitumor-activity

ASSIGNMENT 6: Search the following

Name	Acronym	Search Term	Limit with	Link with
Brady, Sandra	AGRIBUS	Cotton	/TI	Disease
Burgess-Henry, Jana	LANGUAGE	Euphemism	/TI	Sexual
Schlais, Scott	MARINE	Diatoms	/TI	Toxicity
Warren, Hope	AGRI	Triacontanol	/TI	Improvement
Wood, Michael	REGIONAL	Stealth(w)bomber		Beale
Ehorn, William	DEFBUS	Harrier	/TI	California
Fox, Michael	SOFTWARE	Excel		Updates
Hansen, Janet	MEDICINE	Stenosis	/TI	Aortic and Rat
Harrison, Katherine	TOXICOL	Glomerulonephritis	/TI	Rat/DE
Howard, Sean	REVIEWS	Paris Trout		
Laurie, Greg	GEOLOGY	Transform Fault	/TI	
Smith, Ray	WATER	Aquifer	/TI	Butte(w)county

DETAILS:

1. Search the above data within the databases of the given acronym.
2. Limit the search as suggested or use your own format.
3. TYPE up to 10 titles.
4. TYPE any one in format 5 (full format).

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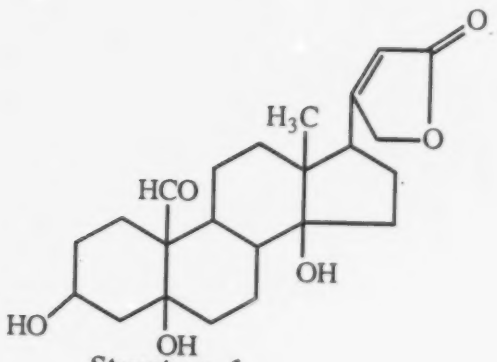
Week 8
Lesson 7 requires the students to determine the name of a complex chemical structure. The process requires the molecular formula and ring data to be prepared **in advance of the online search**. The students must prepare this data after reading a handout on ring data analysis (see page 47). They are given practice problems (with solutions) to master their technique before going online.

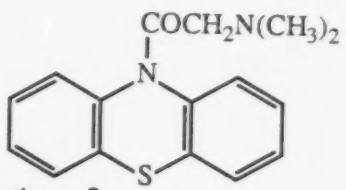
Lesson 7: Chemical Naming from Ring Data

PROCEDURE: Calculate molecular formula and ring data and then search. See handout "Ring System Searching on DIALOG" for details[8]. Practice on the following problems below (solutions given).

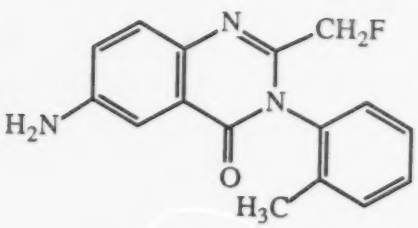
Lesson 7 Ring Structure Analysis Practice Problems



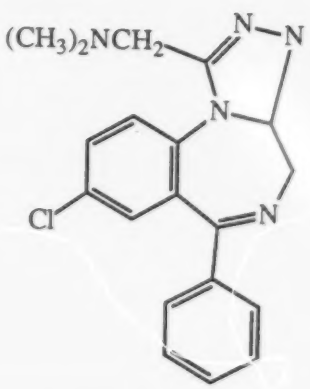
Structure 1



Structure 2



Structure 3



Structure 4

[8]"Ring System Searching on Dialog" can be found on pages 48 – 52 of this manual

ANSWERS

Structure 1
MF=C23H32O6
(01) nr=01; sr=5; ar=C4O.01; fr=OC4.01
(01) nr=04; sr=5,6,6,6;
ar=fr=C5.01-C6.03

Structure 2
MF=C16H16N2OS
(01) nr=03; sr=6,6,6; ar=C4NS.01-C6.02;
fr=NC2SC2.01-C6.02

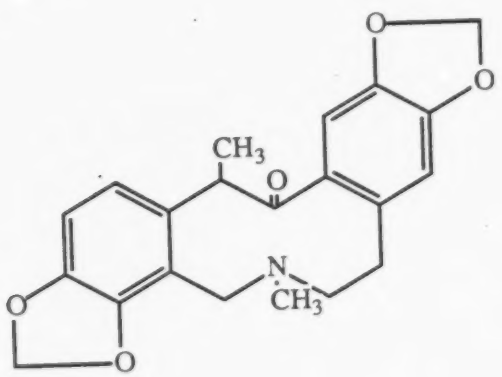
Structure 3
MF=C16H14FN3O
(01) nr=01, sr=6; ar=fr=C6.01
(01) nr=02; sr=6,6; ar=C4N2.01-C6.01;
fr=NCNC3.01-C6.01

Structure 4
MF=C19H18ClN5
(01) nr=01; sr=6; ar=fr=C6.01
(01) nr=03; sr=5,6,7; ar=C2N3.01-C6.01-
C5N2.01; fr=N2CNC.01-C6.01-NC2NC3.01

SAMPLE SEARCH

Note: you must determine ring data and molecular formula before coming for your DIALOG search and it must be correct. Check the accuracy of your calculations with Dr. Miller.

EXAMPLE: What is the name of this compound?



Molecular Formula: MF=C21H21NO5
Ring Data: (01) nr=05; sr=5,5,6,6,10; ar=C3O2.02-C6.02-C9N.01;
fr=OCOC2.02-C6.02-NC9.01

SEARCH DETAILS:

```
?B301
File 301:CHEMNAME
?S MF=C21H21NO5/FF
     S1    104  MF=C21H21NO5/FF
?S AR=C3O2.02-C6.02-C9N.01
     S2     14  AR=C3O2.02-C6.02-C9N.01
?S S1 AND S2
          104  S1
           14  S2
     S3     2  S1 AND S2
```

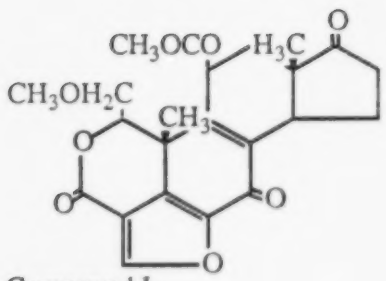
?T S3/5/all
1/5/1
CAS REGISTRY NUMBER: 521-87-9
FORMULA: C21H21NO5
RING SYSTEM DATA:
(01) (nr=05; sr=5,5,6,6,10; ar=C3O2.02-C6.02-C9N.01;
fr=OCOC2.02-C6.02-NC9.01; ir=9603-1-1)
CA NAME(S):
HP=Bis(1,3)benzodioxolo(4,5-c:5',6'-g)azecin-13(5H)-one (9CI), SB=
4,6,7,14-tetrahydro-5,14-dimethyl-, ST=(.PM.)-
SYNONYMS: (.+-.)-Corycavamine; Corycavin; Corycavine
SUBFILE: CHEMNAME 13 LITERATURE REFERENCE(S) IN FILE 399.

1/5/2
CAS REGISTRY NUMBER: 521-85-7
FORMULA: C21H21NO5
RING SYSTEM DATA:
(01) (nr=05; sr=5,5,6,6,10; ar=C3O2.02-C6.02-C9N.01;
fr=OCOC2.02-C6.02-NC9.01; ir=9603-1-1)
CA NAME(S):
HP=Bis(1,3)benzodioxolo(4,5-c:5',6 -g)azecin-13(5H)-one (8CI 9CI), SB=
4,6,7,14-tetrahydro-5,14-dimethyl-, ST=(R)-
SYNONYMS: (+)-Corycavine; Corycavamine
SUBFILE: CHEMNAME 2 LITERATURE REFERENCE(S) IN FILE 399.

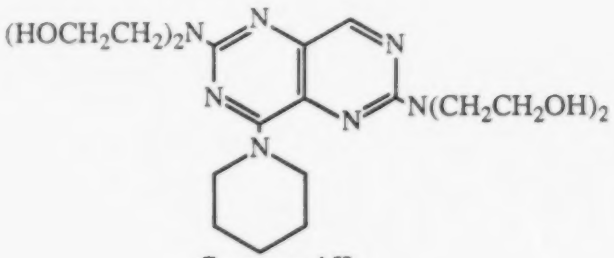
ASSIGNMENT 6: Search the following in the same fashion:

Name	Compound
Brady, Sandra	I
Burgess-Henry, Jana	II
Schlais, Scott	III
Warren, Hope	IV
Wood, Michael	V
Ehorn, William	VI
Fox, Michael	VII
Hansen, Janet	VIII
Harrison, Katherine	IX
Howard, Sean	X
Laurie, Greg	XI
Smith, Ray	XII

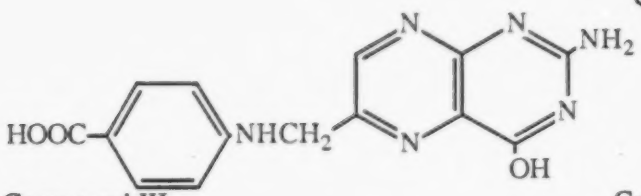
Lesson 7 Unknown Compound List



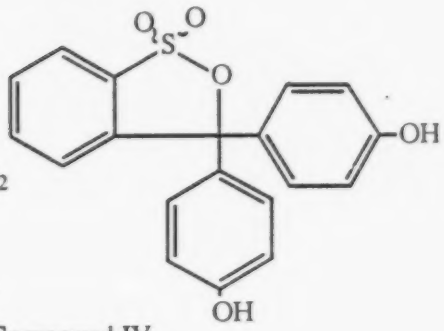
Compound I



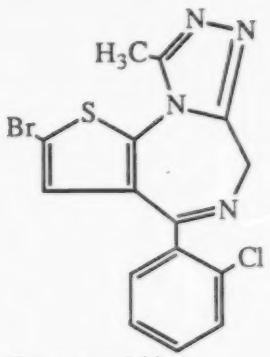
Compound II



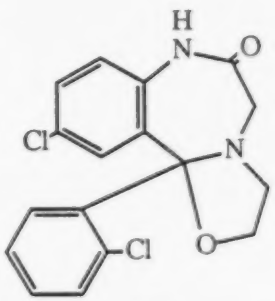
Compound III



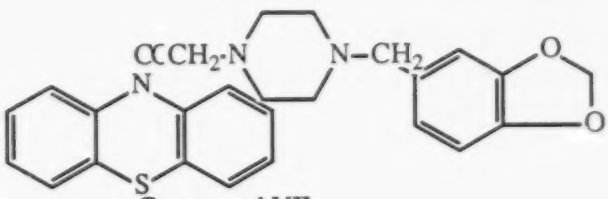
Compound IV



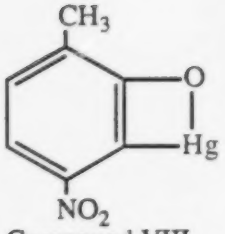
Compound V



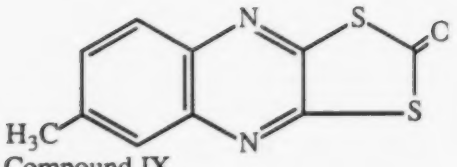
Compound VI



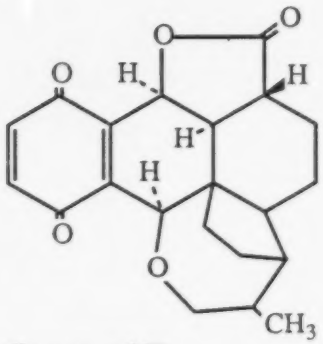
Compound VII



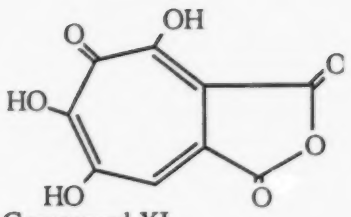
Compound VIII



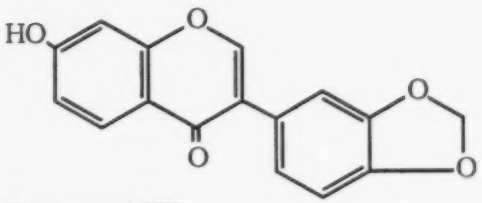
Compound IX



Compound X



Compound XI



Compound XII

Week 9 or 10
Lesson 8 can be an online demonstration *with a twist!* The students can be shown a variety of networking techniques as an online demonstration. This demonstration can include **file transfer**, **remote host connection** and **electronic mail**. As they read the E-mail they discover that it includes an assignment for them! A colleague at a remote site can pose some intriguing questions for each of them. They can work independently on their assigned question(s) and then send the collective answers back to the source via E-mail.

It is much easier to do a collective lesson in this fashion, utilizing the network account of one of the instructors rather than attempting to get an account for each of the students involved.

Please note that the online output is different in these examples. In addition it varies from one online source to the next. For clarification, all annotation is ***bold italics***, online system responses are plain text and operator keyboard response is **bold plain** text.

Lesson 8: Networking-INTERNET, TELNET, FTP, BITNET

INTERNET

CSU-Chico is connected to the worldwide INTERNET computer network. The Internet is a collection of over 700 interconnected computer networks. All of the computers on the Internet implement the TCP/IP (Transmission Control Protocol/Internet Protocol) suite of protocols to connect to the network. These protocols allow one computer network to interact with other physically different computer networks. Computer users on the Internet can share resources such as logging on to remote computers, file transfer with remote computers and sending and receiving electronic mail with colleagues at remote sites. The routing of these shared resources from the user to the host is done by TCP/IP and is invisible to the user. The user need only know the **Internet Address** of the destination computer.

TELNET

Telnet is the INTERNET standard protocol for remote terminal connection service. TELNET allows a user at one site to interact with a remote timesharing system at another site as if the user's terminal or microcomputer was connected directly to the remote computer. Once you establish the session, all commands are passed to the remote computer for processing.

FTP

FTP, File Transfer Protocol, is a utility which lets users access files on other computers which support the TCP/IP protocols. You can use FTP to get files from archive sites or from a colleague who wants to let you copy some files. There are many public FTP sites that accept **anonymous logon**. When you connect with such a site "anonymous" is used as the userid and "logon" is used as the password. If a site does not support anonymous logon you must have have a valid userid and password. You need to learn a bit of UNIX language to negotiate the directories and subdirectories of foreign hosts to find the correct files.

BITNET

BITNET (Because Its Time Network) is a network connecting academic institutions for communication of messages and information. BITNET has direct connections to more than 200 computer sites at various campuses throughout the world. BITNET's main function is the communication of information. This includes transference of electronic mail from one user to another and open subscription to interest groups where members discuss a common interest.

EXAMPLES

BITNET

We logon to the Central Cyber computer which is located in Long Beach. When prompted we use the command "MAIL" to begin the electronic mail function. The system response includes where the mail is from (Bitnet address), when it was received and a short subject summary. We can peruse the subjects and use the command READ to access selected messages.

MAIL>

Summary of messages

#	To/From	Date	Time	Subject
1	Fr C340@CPC865.EAST	Apr 05	18:36	References
2	Fr C340@CPC865.EAST	Apr 09	05:49	Recent Mail
3	Fr C29105@BETA.IST.	Apr 10	12:36	RE: Kerosene
4	Fr NEW-LIST@NDSUVM1	Apr 12	07:33	New List: Orchids
5	Fr EEFA06K@CCS.CSUS	Apr 24	14:47	Questions for DIALOG Students

MAIL> **read 1**

Message 1
Date: Thu, 5 Apr 90 16:48 GMT
From: C340@CPC865.EAST-ANGLIA.AC.UK
To: EEFA06B@CCS.CSUSCC.CALSTATE.EDU
Subject: References

Ron,
just for fun I ran a search in CA for references to CA-online in teaching. The file name is CA-references. The file was converted into a word file and then into an RTF version but was not bin-hexed. Is there any advantage in using bin-hex?

Roger.

MAIL> **read 2**

Message 2
Date: Mon, 9 Apr 90 12:03 GMT
From: C340@CPC865.EAST-ANGLIA.AC.UK
To: EEFA06B@CCS.CSUSCC.CALSTATE.EDU
Subject: Recent Mail

Ron,
I have had some trouble with the e-mail. This is the third time I have attempted to send this note. The long teaching file and the file of references were re-sent last friday. Let me know if they arrive. Our computer people think there may be a problem sending long files to the US via E-mail. If necessary I will split the files.

Have a good easter.
Roger.

The above messages are from Dr. Roger Maskill a chemistry professor at University of East-Anglia in England. He is conducting online searching of Chemical Abstracts as part of a computers in chemistry course. We exchange information via BITNET. An E-mail message has a limited number of screens of text. Longer documents are sent as files.

MAIL>**Read 3**

From: C29105@BETA.IST.RCCN.PT
To: EEFA06B@CCS.CSUSCC.CALSTATE.EDU
Date: Tue, 10 Apr 90 20:09:06 GMT
Subject: Kerosene

Unfortunately, I realized that, in order to get the density of a kerosene with b.p. +/- 150 Celsius degrees, there was more bureaucracy around here than to get married or even buy a new house! If you could send me some data about the 150 C b.p. kerosene, that would be great (prices too...)!

I'm just finishing the job and soon I'll tell you what I've been doing around here.

Catalytic Greetings ...
Name: Jorge Manuel Dias Prates
Address: Buraca, Portugal

Jorge is a chemistry student in Portugal. He left an inquiry about a chemical compound in the CHEM-L discussion group on BITNET. I answered his question and now we correspond occasionally.

MAIL> **read 4**

Sender: NEW-LIST@NDSUVM1
From: DAIR@SCU.BITNET
Subject: NEW LIST: ORCHIDS
To: EEFA06B@CCS.CSUSCC.CALSTATE.EDU,

ORCHIDS on MAILserv@SCU

This unmoderated list was created to share and discuss information and experiences of orchid growers. The discussions will include, but not be restricted to:

-Discussion of types grown
-Cultivation techniques of certain types
-Orchid Society events
-Helpful orchid tips to assist growers
-Scientific, biological issues relating to orchid growth

To subscribe to the list:
Send a mail message (MAIL only) to MAILSERV@SCU.BITNET.

The above message is the announcement of a new discussion group on BITNET. There are hundreds of these groups. Messages sent to the list are distributed to all the members of the list and this process stimulates discussion. Because of the worldwide nature of BITNET, a truly international discussion is commonplace.

MAIL> **read 5**

Message 5
Date: Tue, 24 Apr 90 14:47:30 PDT
From: EEFA06K@CCS.CSUSCC.CALSTATE.EDU
To: eefa06b@CCS.CSUSCC.CALSTATE.EDU
Subject: Questions for DIALOG Students

1.What is known about the reactions of ethylene, C2H4, with ozone (rate law and rate constants)? (Sandra Brady)
2.How does one generate (synthesize) and detect singlet oxygen? (Jana Burgess-Henry)
3.What is known about the reactions of ethylene (ethene) with singlet oxygen (rate law and rate constants)? (Scott Schlais)
4.Are there any photochemical reactions known for ethylene with oxygen? (Hope Warren)
5.Are there any photochemical reactions known for ethylene with water vapor? (Michael Wood)
6.Are there any photochemical reactions known for ethylene with carbon dioxide? (William Ehorn)
7.Are there any photochemical reactions known for ethylene with itself in a polymerization? (Michael Fox)
8.Describe possible syntheses of hydroxylapatite, Ca10(OH)2(PO4)6? (Janet Hansen)
9.Describe possible syntheses of fluoroapatite, Ca10F2(PO4)6? (Katherine Harrison)
10.What is the difference between the two forms of mercury(II) iodide, red and yellow, especially in terms of their thermodynamics? How are they made? (Sean Howard)

11. What is the difference between the two forms of mercury(II) oxide, red and yellow, especially in terms of their thermodynamics? How are they made? (Greg Laurie)
12. What is the difference between the two forms of mercury(II) sulfide, red and black, especially in terms of their thermodynamics? How are they made? (Ray Smith)

E-mail is a good way to exchange information. Dr. Postma(EEFA06K@CCS.CSUSCC.CALSTATE.EDU) has posed some questions. Lesson 8 assignment is to search for answers to the above questions. The results will be collected as text files and E-mailed to Dr. Postma.

FTP

We connect with the HP850 computer which supports the FTP protocol. After beginning the FTP program we OPEN a connection with U. C. Davis by giving their Internet Address. Once connected to Davis we use anonymous logon. We negotiate the filing system with the commands: DIR (show directory); CD (change directory). Finally we locate the needed file "BabbleList" and GET the file. Note: files(rw-r--r--) are distinguished from directories(drwxr-xr-x) by the initial letter r or d.

CONNECT 2400
ENTER CLASS HP850
login: abc123
Password:
$ ftp
ftp> **open ucdavis.ucdavis.edu**
Connected to ucdavis.ucdavis.edu.
Name: anonymous
Password:
ftp> **dir**

```
drwxr-xr-x    2 ftp    ftp        1536 Apr 11 14:51 named.files
drwxrwxrwx  5 ftp    ftp        1024 Apr 10 07:19 pub
dr-xr-xr-x    2 ftp    ftp        5120 Mar  5 08:45 rfc
```

ftp> **cd pub**
ftp> **dir**

```
-rw-r--r--    1 ftp    ftp      838144 Dec 21 13:10 24bit.sit
-rw-r--r--    1 ccdan  staff      1852 Nov  2 12:31 BabbleList
drwxr-xr-x  2 ftp    ftp         512  Apr  9 11:47 JIS
```

ftp>**get BabbleList**
1852 bytes received in 1.64 seconds (1.10 Kbytes/sec)
ftp> **close**
ftp> **quit**

At this point we CLOSED the connection to U.C. Davis and QUIT FTP. This still leaves us connected to the HP850. We now use the commands: LS (lists the files in my account); CAT (prints the file specified on the computer screen).

$ ls

?1lBabbleList

$ cat BabbleList

Paul Detjens <ccdpaul@pollux.ucdavis.edu>
Dan Dorough <ccdan@ucdavis.ucdavis.edu>
Dana Drennan <ccdana@castor.ucdavis.edu>
Hugh Everett <cche@ucdavis.ucdavis.edu>
Jason Gabler <ccjason@castor.ucdavis.edu>
Jonathan Hahn <hahn@amelia.nas.nasa.gov>

We can have a file from U.C. Davis in a few minutes. The above "BabbleList" is a list of colleagues and their INTERNET addresses.

In the next example a Macintosh computer program (i.e. software) that continually calculates the U.S.Debt will be downloaded from Stanford University.

```
$ ftp
ftp> open 36.44.0.6
Connected to 36.44.0.6.
Name: anonymous
Password:
ftp> dir
drwxr-x--x    2 root    staff        512 Nov 12  1988 etc
drwxr-sr-x    2 13       8          1536 Apr 13  13:58 imap
drwxr-xr-x   26 mac   info-mac      512 Apr 13  02:15 info-mac
drwxrwsrwt   6 root     8          1536 Apr 10  18:06 pub
ftp> cd info-mac
ftp> dir
-rw-r--r--    1 macmod  info-mac     757 Mar 15 16:04 00readme.txt
drwxr-xr-x  2 macmod  info-mac     1536 Apr 10 16:17 comm
drwxr-xr-x  2 macmod  info-mac     4608 Apr 11 17:27 da
drwxr-xr-x  2 macmod  info-mac     2048 Apr  7  13:24 demo
drwxr-xr-x  2 macmod  info-mac     1024 Apr  3  00:30 virus
ftp> cd da
ftp> dir
-rw-r--r--  1 macmod  info-mac    55806 Dec 21  1988 scientific-calculator.hqx
-rw-r--r--  1 macmod  info-mac    23134 Nov  7 18:14 scientific-conversions.hqx
-rw-r--r--  1 macmod  info-mac     8657 Feb 26  1989 us-debt-20.hqx
-rw-r--r--  1 macmod  info-mac     8034 Mar  7  1989 world-population.hqx
ftp> get us-debt-20.hqx
8657 bytes received in 12.47 seconds (0.68 Kbytes/sec)
ftp> close
ftp> quit
$ ls
?1lBabbleList
 us-debt-20.hqx
```

Notice that my file now contains two items. Computer programs are code and are not readable. This file "us-debt-20.hqx"would need to be further downloaded to a Macintosh computer to be useful. Stanford University Archives have thousands of useful computer programs that are Public Domain.

TELNET

The HP850 and the Central Cyber both support TELNET. In the following example TELNET is used to connect to the University of California MELVYL System. MELVYL is a very user friendly online card catalog. This can be useful for general information or for planning interlibrary loans or perhaps a trip to U.C. Davis to procure references that are unavailable at Chico. In the following example the command FIND PE locates the given periodical title and FIND PA locates the given author name.

$ telnet
>telnet **open 31.1.0.1**

MELVYL SYSTEM DATABASES
Welcome to the MELVYL CATALOG Database
Contents: As of 4/13/90, approximately 5,509,848 titles
for materials in the University of California libraries
and the California State Library.

Search request: **FIND PE THE AFRICAN VIOLET MAGAZINE**
Search result: 1 record found in the Periodicals file

1. African violet magazine.
[Knoxville, Tenn., African Violet Society of America]
UCB BIOS SB413.A4 A4 11(Sept 1957)-37(1984)-; Shelved at
BIOSCIENCES OFF CAMPUS COLLECTION
UCLA CLU-BIO W1 AF547

Search request: **FIND PA KUMLI, KARL**
Search result: 1 record at all libraries
1. Kumli, Karl F., 1927-
Fundamentals of chemistry / Karl Kumli. New York : D. Van Nostrand Co.,
c1980. UCB Chemistry QD31.2 .K841 1980

telnet> **quit**
$ exit

Week 10
The instructor of each of the three chemistry courses involved now assigns projects and written reports that include literature review. In addition, the student has an ongoing assignment from Lesson 8.

The laboratory is still supervised but the students are well prepared to do mostly independent online searching.

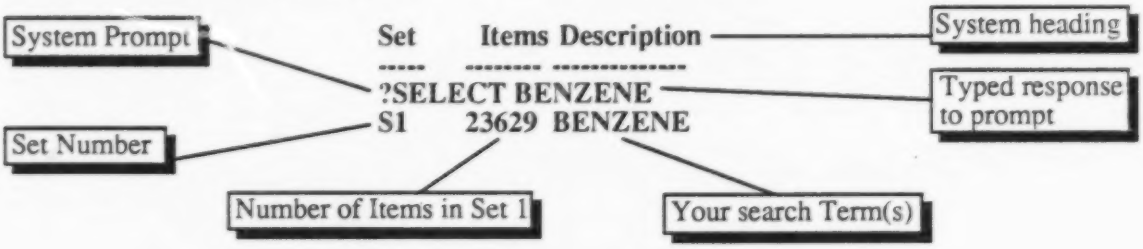
By now, many of the students have discovered that with over 300 databases available, literature review of most subjects is as close as the keyboard. As time allows, we let students search other projects also.

CHAPTER IX
ONLINE SEARCHING BASICS

Information
The information contained in each database is organized into **records.** A record may be a bibliographic citation with abstract, or a direct entry of company name, address, and telephone number, or a table of chemical or physical data, or the complete text of an article. Each record in a database is identified by an "accession number" that appears on the first line.

BEGIN by choosing a database
Databases are identified by **file numbers**. To initiate a search in a database, enter the command BEGIN x,y,z... (abbreviated B x,y,z...), where x, y and z are the file numbers of the desired databases. Up to 20 files can be searched simultaneously.

SELECT the desired term(s)
The SELECT command, abbreviated S, retrieves sets of items containing the search term(s) specified. In the example below, Set 1 (S1) is composed of 23629 records (hits) that include the word BENZENE in the basic index.



Truncation
To retrieve variations in word endings, place a question mark at the end of a word. With this method any number of characters can follow the word stem. For example spectro? would retrieve spectroscopic, spectroscopy, spectrometer, and spectroscopist.

A ? followed by a space and another ? allows only one additional character following the word stem. This can be used to retrieve singular and plural terms.

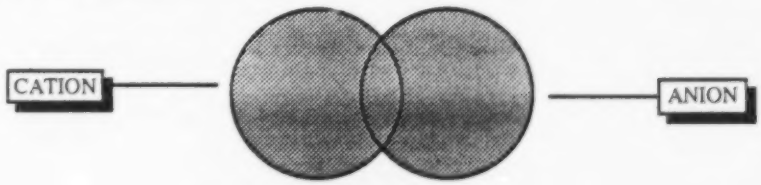
To specify the maximum number of characters following a word, enter as many ? as the number of characters you wish.

A truncation character can be in the middle of a word. For example ALK?NE will retrieve alkane, alkene and alkyne.

AND, OR, NOT the logical operators
These logical operators help define the logical relationship among the search terms. All three operators are used in SELECT commands. Logical operators are also known as Boolean operators.

OR operator
OR groups several search terms into a single set. Thus, the retrieval of CATION OR ANION

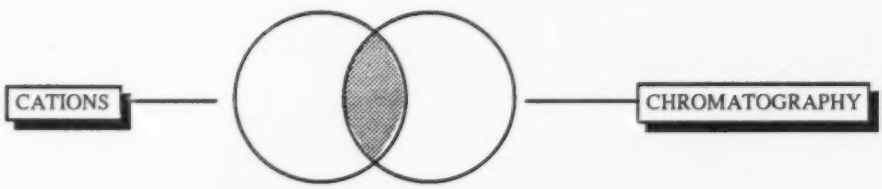
consists of all records containing one or both of these terms. The following Venn diagram and sample search illustrates the use of OR:



?S CATION OR ANION
20468 CATION
13924 ANION
S1 22599 CATION OR ANION

AND

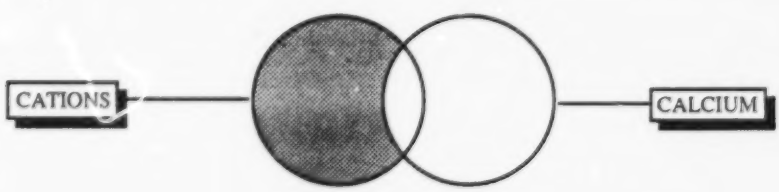
The AND operator retrieves records where two or more search terms or group of search terms occur in the same record. Thus, CATIONS AND CHROMATOGRAPHY retrieves only those records containing both of these words. Again as seen by diagram and sample search:



?S CATIONS AND CHROMATOGRAPHY
20468 CATIONS
2856 CHROMATOGRAPHY
S2 1338 CATIONS AND CHROMATOGRAPHY

NOT operator

NOT can exclude certain search terms from being retrieved. The search CATIONS NOT CALCIUM retrieves records that contain the term CATIONS but eliminates from the set those records that contain the term CALCIUM. The Venn diagram illustrates:



?SELECT CATIONS NOT CALCIUM
20468 CATIONS
1256 CALCIUM
S3 19178 CATIONS NOT CALCIUM

Logical Operator Order

DIALOG processes NOT, then AND then OR logic in a SELECT statement. To vary this order you must use parentheses. Expressions enclosed in parentheses are executed before those that are not.

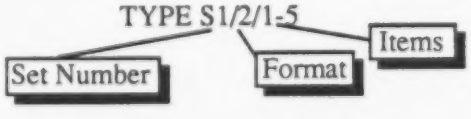
Free-Text Searching (Adjacency or Proximity Searching)
Proximity searching provides a means for searching for phrases that appear in a record. This process can be used to retrieve words that are adjacent, or near each other. The distance between terms, word order, and hierarchical relationships in descriptors can be specified. Proximity operators are similar to AND logic: both terms must be present in the same field. The proximity operators are listed and described below:

Operator	Details	Examples	Retrieval
(W)	Words adjacent and in the order specified.	GAS(W)CHROMATOGRAPHY	Gas Chromatography
(nW)	Up to n intervening words, in order specified.	HEAT(1W)FUSION	Heat of Fusion
(N)	Words adjacent; no word order specified.	DONALD(N)CRAM	Donald Cram, Cram, Donald
(nN)	Up to n intervening words; no word order specified.	CHARGE(1N)MASS	Charge to Mass, Mass to Charge, Charge/Mass, Charge-Mass
(F)	Words anywhere in the same field, no word order specified.	AIR(F)POLLUTION	Identifiers: environmental pollution lead, safety lead air
(L)	Words in same descriptor unit; no word order specified.	COFFEE(L)CAFFEINE(L)BEANS	Descriptors: Coffee... Caffeine dem in beans of
(S)	Words in the same subfield as defined by database; no word order specified	AIR(S)POLLUTION	Identifiers: ESR reactor air, pollution air kinetics

S is the most versatile to use when strict word order is not vital and AND is too broad. S requires words to be in the same subfield as defined by database (e.g for CA Search: Title, Descriptor, Identifier, CA Section Title). S maintains the specificity of L, but extends beyond the descriptor field. The F operator retrieves all that S does plus those where words are in different subfields within a field. Therefore the ranking for specificity is W > N > L > S > F where W is the most specific.

TYPE
Reviewing results online allows you to make modifications in the strategy, or to retrieve final results immediately. Displaying records online does not end the search or interfere with further modification and SELECTion of terms.

The TYPE command, abbreviated T, displays records at your terminal. The command is followed by the number of the set that you wish to view, a format specification, and finally the number(s) of the record(s) to be viewed. The example below requests the first five records in set one, displayed in Format 2.



The item numbers can indicate a single record, a range of records (e.g. 1-10), or a group of records (e.g. 1,5,9,11-21). You can enter the word ALL to type all the records in the designated set.

Format Specifications
Formats vary from database to database depending on the type of records contained in each. Always check the Bluesheets for exact format specifications. As an example in CA Search the following formats are pre-defined: 1 CA volume and abstract number; 2 bibliographic citation and key words; 3 bibliographic citation; 4 full format with tagged fields; 5 full record; 6 title and journal reference; 8 title, key words and descriptors; 9 title only.

Search Limitation
Careful choice of search terms is often not enough to limit a search. A student was interested in "Hands-on Education" and carefully chose her search terms to be: EXPERIENTIAL AND EDUCATION. The response in File 1 (ERIC the education database) was a staggering 4387 hits. This is obviously an unmanageable number and must be decreased significantly! The search terms are fine but the problem is that unless otherwise commanded, DIALOG searches the "Basic Index" This index is typically the title, abstract, and subject descriptors. This means that if the words EXPERIENTIAL AND EDUCATION appear anywhere in the article it is SELECTed! This search was simplified by changing the command slightly: (EXPERIENTIAL AND EDUCATION)/TI. The addition of /TI limits the search to titles only. The result was a manageable 162 hits. The titles of these hits were TYPED (this took about 2 minutes) and then the titles were examined offline and relevant hits were later TYPED in Format 5 to give abstract and citation. Other ways of limiting searches are presented below.

Field Suffix Codes
As in the above example a slash (/) followed by a letter field suffix code, such as TI for title, will limit the search to that specific field. For a complete listing see the Bluesheets for each database. A few examples are: /AB for abstract, /SH for section heading, /DE for descriptor, /ENG for English language and /NPT for nonpatent. For an example see Lesson 1 (page 11).

Prefix Codes
Any fields other than the "Basic Index" are known as "Additional Fields". There are many different kinds and Bluesheets should be consulted for details. Some common prefix codes that can be searched are shown below. For an example see Lesson 2 (page 13).

There are many variations in prefix code and the form of entry for the data. There is no easy way to remember all of the possible variations, so always consult the Bluesheets.

Field	Prefix	Example
Author	AU=	AU=CRAM, DONALD
Corporate Source	CS=	CS=NASA
Journal Name	JN=	JN=J. ORG. CHEM.
Publication Year	PY=	PY= 1987
Language	LA=	LA=FRENCH
Registry Number	RN=	RN=482-94-0
Patent Number	PN=	PN= 32889
State	ST=	ST= CA

Comment Lines
You can save one or more "Comment lines" to be included as part of your search. These lines are not used in the search. To enter a comment line, type an asterisk (*) as the first character in the line and then type the comment. These are useful for personal identification or reminders.

Saving Search Strategy
DIALOG enables access to many different databases. It is convenient to use the same search strategy for several files and searching multiple databases requires planning.

☆ Plan the search carefully before going online. Have names and Registry Numbers ready.

☆ Codes, limits, prefixes, or suffixes that work in one file may not work in another. Be prepared for such differences by using the Bluesheets.

☆ Truncate carefully, particularly for author entries and variant spellings. Use EXPAND when necessary.

☆ Use SAVE TEMP to save your search strategy before switching files. The SAVE TEMP command stores your search for one week. This type of SearchSave can be called up and used in any file. The following search illustrates the search storage technique:

Topic: Find Information on caffeine extraction

```
?begin 399
File 399 CA Search 1967-1989
? select caffeine(l)extraction
              8811   caffeine/de
             20608 extraction/de
      S1        10   caffeine(l)extraction
?SAVE TEMP
Temp SaveSearch "TC010" stored
?BEGIN 305
File 305: Analytical Abstracts Online
?EXS TC010
              43   caffeine/de
            2060   extraction/de
      S1       2   caffeine(l)extraction
```

Note that the search was developed in one file and then saved. When another file was opened the stored search was recalled with EXECUTE STEPS (abbreviated EXS) followed by the serial number assigned by DIALOG. If you are not sure of the serial number of a stored SearchSave use the RECALL TEMP command to view a list of your temporary saves.

EXPAND to view database indexes
The Basic Index or the Additional Indexes of a database can be examined with the EXPAND command. The system response is a twelve-line display of index terms in alphanumeric order. At the far left are the "E numbers" which identify the entries. These E numbers can be SELECTed as though they were the search terms they represent. Once selected they become sets that can be logically linked and typed. The next column, marked "Items", lists the number of records for each word or phrase listed at the right. Multiple-word entries are descriptors or identifiers that have been phrase indexed. The third entry is the term expanded and is marked with an asterisk. The PAGE command (abbreviated P) displays the next twelve lines of index entries that follow the last line in a previous EXPAND. PAGE- backs up one list at a time. In the following example, the word AROMATICITY is EXPANDed:

```
? EXPAND AROMATICITY
Ref      Items     RT      Index-term
E1       16                AROMATICITIES
E2       1                 AROMATICITTY
E3       17773     1       *AROMATICITY
E4       1                 AROMATICITY,
E5       1                 AROMATICITY,.SIGMA.-
E6       2                 AROMATICITY,ANTI
E7       16                AROMATICITY,ANTI-
E8       1                 AROMATICITY,ANTIHOMO
E9       5                 AROMATICITY,BICYCLO-
E10      1                 AROMATICITY,BISHOMO-
E11      1                 AROMATICITY,CYCLIC
E12      2                 AROMATICITY,DIATROPICITY
```

Related Terms (RT the Online Thesaurus)
Some databases on DIALOG provide a thesaurus as part of the online file. The words and phrases in the thesaurus are usually indexed as descriptors in the database. The command ?THESAURI will list databases with thesari.

To view the contents of an online thesaurus, enter EXPAND followed by the search term of interest. If thesaurus terms are available in the database, an extra column appears and is labelled "RT" for Related Terms. Notice that in the example above AROMATICITY has one related term. To view the Related Term for AROMATICITY, enter a second EXPAND command followed by the E number with the related term. The resulting display shown below is similar to the prior EXPAND display except that the entry numbers begin with R to show that all the terms in the list are related. Continuing from the above search example:

```
?E E3
Ref   Items    Type   RT   Index-term
R1    1927            1    *AROMATICITY
R2    181812   R      13    RESONANCE
?E R2
Ref   Items Type  RT  Index-term
R1    181812      13  *RESONANCE
R2    1927   R    1   AROMATICITY
R3    8514   R    2   CONJUGATION
R4    26033  R        ELECTRIC CIRCUITS
R5    38376  R   17   ELECTRON CONFIGURATION
R6    46217  R    6   ELECTRON SPIN RESONANCE
R7    967    R        FERMI RESONANCE
R8    624    R    1   HYPERCONJUGATION
R9    73888  R    6   NUCLEAR MAGNETIC RESONANCE
R10   3541   R    5   NUCLEAR QUADRUPOLE RESONANCE
R11   2083   R    2   OPTICAL DOUBLE RESONANCE
R12   517    R    2   OPTICAL DOUBLE RESONANCE, LEVEL CROSSING
```

The column labelled "Type" gives the relationship among the terms in the list. Most databases use the following abbreviations:

F Use for (this term is preferred to the term EXPANDed)
U Use (use the EXPANDed term as the preferred term)
N Narrower term
B Broader term
R Related term (neither broader nor narrower)

EXPAND in Additional Indexes

The prior examples were EXPANDed in the Basic Index. Expand can also be used in additional fields (indexes). The following search illustrates the search for the works of a particular author. You need to know the full name of the author in question or you may miss variant entries.

```
File 399:CA SEARCH
?E AU=KORTE, W
Ref      Items    Index-term
E1       1        AU=KORTE, W.
E2       7        AU=KORTE, W.D.
E3       0        *AU=KORTE, W
E4       1        AU=KORTE, WILFRED
E5       6        AU=KORTE, WILLIAM D.
E6       2        AU=KORTE, WULF
E7       1        AU=KORTEEV, M.P.
E8       1        AU=KORTEEV, V.A.
E9       2        AU=KORTEGAARD, BIRCHARD L.
E10      2        AU=KORTEGAS, K.E.
E11      2        AU=KORTEHISTO, ARIMO RANIER
E12      1        AU=KORTEJARVI, ARNOLD
  Enter P or E for more
?SELECT E1,E2,E5
  1   AU=KORTE, W.
  7   AU=KORTE, W.D.
  6   AU=KORTE, WILLIAM D.
  S1   14   E1,E2,E5
```

If you had chosen Korte, William D. as the search term in the above example you would have missed eight of his publications. Be prepared for variant spellings! Be prepared for different formats i.e. SCISEARCH (File 34) does not use punctuation and does not spell out any names other than the surname. Consult the Bluesheets for details.

Searching Multiple Files (DIALOG OneSearch™)

To use OneSearch, simply enter more than one file number (separated by commas) in a BEGIN command. You can also enter a DIALINDEX category by using the appropriate acronym. From this point on, you are searching all the files indicated in your BEGIN command. When you SELECT a term, you will see the number of records retrieved for each term by your group of databases. Similarly, when you EXPAND a term, you receive an E-numbered list of terms showing the number of records that your group of databases contains for each term. In the following search, files 5, 76, and 399 are searched simultaneously.

```
?B 5,76,399
System:OS  - DIALOG OneSearch
    File    5:BIOSIS PREVIEWS
    File   76:LIFE SCIENCES COLLECTION
    File 399:CA SEARCH
     Set  Items  Description
     ---  -----  -----------
?SS algae(s)inhibition(s)copper
     S1   45521  ALGAE
     S2  459363  INHIBITION
     S3  287497  COPPER
     S4      25  ALGAE(S)INHIBITION(S)COPPER
?S S4/eng
     S6      17  S4/ENG
```

```
?T s6/ti/1,8,14
 6/TI/1     (Item 1 from file: 5)
The toxic effect of copper on Oscillatoria (Trichodesmium) theibautii

6/TI/8     (Item 2 from file: 76)
  Evaluation of toxic effects of heavy metals on unicellular algae. 5.
Influence of extracellular products on toxicity and on type of inhibition.

6/TI/14     (Item 2 from file: 399)
  Treatment of the water in pools or other bodies of water
```

Using OneSearch is as easy as searching a single database and is more efficient than searching multiple databases individually.

MAP

The MAP command retrieves search terms from a specified field in a record or group of records and creates a SearchSave of them. MAP makes your online session easier by scanning records for search terms of interest and then storing them for you to use later. This eliminates the need to re-key those terms while online.

MAP removes duplicate terms within the specified group of records and sorts remaining terms in alphanumeric order. You can EXECUTE the SearchSave created by MAP in any database that includes the field used in the original search.

MAP is particularly important in chemical searching. MAP TEMP is used to save CAS Registry Numbers (MAP RN TEMP) or chemical name synonyms (MAP SY TEMP) for easy cross-file searching. A typical strategy would be to search CHEMNAME (File 301) and MAP RN TEMP or MAP SY TEMP and then BEGIN CA SEARCH (File 399) and EXECUTE STEPS to recall the SearchSave. The following example MAPs all CAS Registry Numbers of a substance with the trade name Londax.

```
?B 301
File 301:CHEMNAME 1967-Sep89
    Set  Items  Description
    ---  -----  -----------
?S LONDAX
    S1      1  LONDAX
?T S1/5/1
 1/5/1
CAS REGISTRY NUMBER: 83055-99-6
  FORMULA: C16H18N4O7S
  REPLACED CAS REGISTRY NUMBER(S): 96081-37-7 104466-83-3 110280-01-8
  CA NAME(S):
    HP=Benzoic acid (9CI), SB=
      2-((((((4,6-dimethoxy-2-pyrimidinyl)amino)carbonyl)amino)sulfonyl)
      methyl)-, NM=methyl ester
  SYNONYMS: Bensulfuron-methyl; DPX-F 5384; F 5384; Londax
 ?MAP RN TEMP
serial#TB009

?B 399
File 399:CA SEARCH 1967-1989
    Set  Items  Description
    ---  -----  -----------
```

```
?EXS TB009
        38  RN=83055-99-6
         1  RN=96081-37-7
         3  RN=104466-83-3
         1  RN=110280-01-8
   S1    43  RN=83055-99-6 + RN=96081-37-7 + RN=104466-83-3 +
          RN=110280-01-8
?S S1/ENG,NPT
   S2    16  S1/ENG,NPT
?T S2/3/1
 2/3/1
 109188881   CA: 109(21)188881j   JOURNAL
 Determination of bensulfuron methyl residues in rice grain and straw by high-performance liquid chromatography
 AUTHOR(S): Slates, Robert V.
 LOCATION: E. I. Du Pont de Nemours and Co., Inc., Wilmington, DE, 19898, USA
 JOURNAL: J. Agric. Food Chem.  DATE: 1988  VOLUME: 36  NUMBER: 6  PAGES:
1207-11  CODEN: JAFCAU  ISSN: 0021-8561  LANGUAGE: English
```

Note that a chemical can have "replaced registry numbers". All the registry numbers are included in the MAP command and set one (S1) in File 399 indicates this.

CHAPTER X
MISCELLANEOUS

Dialog™ Database Descriptions

The following databases were frequently used by our students:

THE AGROCHEMICALS HANDBOOK (File 306)
Provides information on the active components found in agrochemical products used worldwide.

ANALYTICAL ABSTRACTS (File 305)
Devoted to all aspects of analytical chemistry.

BEILSTEIN ONLINE (File 390)
This is the database version of Beilstein's *Handbuch der Organischen Chemie*. The handbook is the world's most extensive collection of data on known organic compounds.

BIOTECHNOLOGY ABSTRACTS (File 357)
Covers all aspects of biotechnology, including biochemical engineering.

CA SEARCH (File 399)
The Chemical Abstracts Search database includes citations to the literature of chemistry and its applications. Complete index contains CA General Subjects heading from a controlled vocabulary, and CAS Registry numbers.

CHEM-INTELL (File 318)
Information on manufacturing plants as well as trade and production figures.

CHEMICAL BUSINESS NEWSBASE (File 319)
Worldwide chemical news about chemicals, use and production with an emphasis on European news.

CHEMICAL ENGINEERING ABSTRACTS (File 315)
Provides information on industrial practice and theoretical chemical engineering.

CHEMICAL EXPOSURE (File 138)
A comprehensive database of chemicals that have been identified in both human tissues and body fluids and feral and food animals.

CHEMICAL REGULATIONS AND GUIDELINES SYSTEM (File 174)
An index to U.S. federal regulatory material relating to the control of chemical substances.

CHEMICAL SAFETY NEWSBASE (File 317)
Provides information on the hazardous and potentially hazardous effects of chemicals.

CHEMNAME (File 301)
Contains a listing of chemical substances cited in CA SEARCH more than one time since 1967. Each record in CHEMNAME contains identifying information about each chemical substance such as the CAS Registry number, molecular formula, synonyms, and complete ring data The specific purpose of this file is to enable substance searching and identification on the basis of nomenclature, trade names and others.

COMPENDEX PLUS (File 8)
Subjects covered include: civil, biological and chemical engineering.

DISSERTATION ABSTRACTS ONLINE (File 35)
Subject, title and author guide to all dissertations accepted since 1861. Abstracts available after 1980.

ENVIRONLINE (File 40)
Covers the world's environmental information.

FOOD SCIENCE AND TECHNOLOGY ABSTRACTS (File 51)
Provides access to literature in the areas related to food science and technology. Allied disciplines such as chemistry and biochemistry are also covered.

HEILBRON (File 303)
This is the chemical properties database.

KIRT-OTHMER ONLINE (File 302)
This is an exhaustive and comprehensive treatise of applied chemical science and industrial technology.

LIFE SCIENCE COLLECTION (File 76)
Information in the fields of: biochemistry, neuroscience, toxicology and others.

McGRAW-HILL ONLINE (File 624)
Provides complete text for Biotechnology Newswatch, Chemical Engineering and Chemical Week and many others.

THE MERCK INDEX ONLINE (File 304)
This is an updated and expanded version of the printed 10th Edition. Several hundred additional records are available that are not in the printed edition.

NTIS (File 6)
Reports are available from such agencies as NASA, DDC, DOE, HUD, DOT and 240 others. These reports cover a wide spectrum and include chemistry, biology and medicine.

PAPERCHEM (File 240)
Includes the chemistry of carbohydrates, cellulose, hemicelluloses, lignin and wood extractives.

PASCAL (File 144)
Pascal is a multidisciplinary database covering physics, chemistry, biology, medicine, psychology, applied and earth sciences.

POLYMER ONLINE (File 322)
Provides coverage of polymer science and engineering.

RTECS (File 336)
The Registry of Toxic Effects of Chemical Substances (RTECS) is a database of basic toxicity information for over 100,000 chemical substances.

SCISEARCH (Files 34, 432-434)
A multidisciplinary index to the literature of science and technology. Contains 90% of the world's significant scientific literature.

SMOKING AND HEALTH (File 160)
Aspects covered include: chemistry, pharmacology, toxicology, mortality and morbidity.

TSCA CHEMICAL SUBSTANCES INVENTORY (File 52)
Lists chemical substances in commercial use in the U.S.

DIALOG™ logon using Procomm™ software (IBM compatible computer)

NOTES:

1. A carriage return is shown by the following symbol: < >
2. ALT stands for the ALTERNATE Key
3. Characters may be typed in upper or lower case
4. Quotes indicate a system response that appears on the screen

PROCEDURE:

1. **ALT D** (i.e. depress ALT and D at the same time) displays the Dialing Directory
2. Find the number (1-10) associated with DIALOG and type **that number**
3. type **< >**
4. "CONNECT 1200" will appear
5. A line of gibberish will appear
6. Type an A but do not hit < >
7. **"PLEASE LOG IN:"** is a system prompt; you respond with
8. **ALT 1** also, if necessary (check dialog box) type **ALT L** to toggle printer on
9. **"PLEASE LOGON:"** you respond with
10. **ALT 2**
11. **"ENTER PASSWORD:"** you respond with
12. **ALT 3**

At this point you will be connected to DIALOG™. The system will welcome you and possibly give you some news and information. The system will then automatically start you in **FILE 399:CA SEARCH** and you can stay in this database or begin another. The system prompts you with a question mark.

After you complete your search type:

1. **ALT 4**
2. The system will respond with search times and other information
3. **ALT L** will toggle the printer off
4. **ALT H** will hang up and end the session

The last four steps would be omitted if there is someone waiting to begin a search after you are done.

Catalog Plus Logon and Logoff on IBM Compatible Computer

NOTES:

1. A carriage return is shown by the following symbol: < >
2. CTRL stands for the CONTROL Key
3. ALT stands for the ALTERNATE Key
4. Characters may be typed in upper or lower case
5. Quotes indicate a system response that appears on the screen

PROCEDURE:

1. **ALT D** (i.e. depress ALT and D at the same time) displays the Dialing Directory
2. Find the number (1-10) associated with LIBRARY and type **that number**
3. type < >
4. "CONNECT 1200" will appear then you type < >
5. Gibberish will appear on the screen
6. Type **CATDIAL** (the letters will not appear on the screen)
7. Type < >
8. More gibberish appears and you respond with
9. **CTRL O** also, if necessary (check dialog box) type **ALT L** to toggle printer on

At this point you will be connected to the Meriam Library Online Catalog. The system prompts you to select a search type. For additional information see "Catalog Plus" and "Catalog Plus Remote Access Guide". Keep in mind that the commands are the same for a remote terminal or a terminal in the library, but the keystrokes for the commands are different.

After you complete your search type:

1. **CTRL O**
2. The system will return to the introductory screen
3. **ALT L** will toggle the printer off
4. **ALT H** will hang up and end the session

The last four steps would be omitted if there is someone waiting to begin a search after you are done.

Catalog Plus Remote Access Guide

Welcome to Catalog Plus at CSU-Chico.
Meriam Library's online catalog is available from terminals in the library and can also be accessed from your personal computer or terminal during all open library hours.

The online catalog provides access to the library's book, periodical, and nonprint media collections. Current location and circulation status are immediately available.

Remote Access
1) Set your computer for VT-100 emulation.
2) Set your computer for 1200 baud, 8 data bits, no parity.
3) Set your computer to dial the communications number

Logon
1) Dial in to the campus computer. Wait 10 seconds.
2) Press **Return**. The system will respond with "enter class."
3) Type **CATDIAL** and press **Return**.
4) When the word "Connected" appears, press **Control** and **O** to display the introductory screen:

CATALOG PLUS is a MORE POWERFUL ONLINE CATALOG:

You may search the catalog using any of the methods listed below. Choose by pressing the corresponding number key. You may request assistance at any time by pressing the HELP key.

To Search By: (1) SUBJECT
(2) AUTHOR
(3) TITLE
(4) ALL CATEGORIES
(5) CALL NUMBER
Press Selection Number

Logoff
1) Press **Control** and **O** to return to the introductory screen then use the command to hang up.

Quick Search Guide
1) Get to the introductory screen as described above.

2) Decide if you want to search in SUBJECT, AUTHOR, TITLE, ALL CATEGORIES, or CALL NUMBER and press the corresponding number.

3) Type in your search term(s).

4) **Press Control W** (Browse)
-To scan alphabetically through author, title, and subject entries.
-When you know exact author, title, or Library of Congress subject heading.
-For a call number search.

or

Control K (Keyword)
-When you do not know the correct word order, or all words in an author, title, or subject.
-When using boolean operators, truncators, and limiters.

5) Items will appear on the screen. Press the number preceding the term you want to see. The system will display a short record with the call number and circulation status.

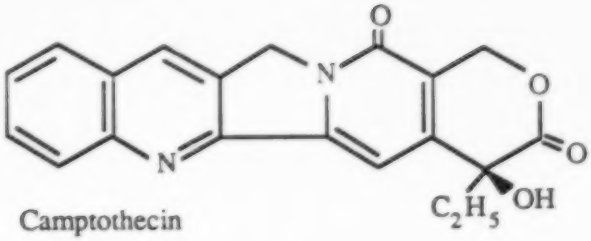
6) Follow online instructions for full record, search history, compose and other commands.

7) Press Control O to begin a new search.

Function Key Equivalents

Function	Keys	Description
Start Over	Control O	The system returns you to the welcome screen.
Help	Control Y	System gives help.
Compose	C	Allows you to enter a new search term.
Next	N	Displays the next page of a multiple page record.
Previous	P	Displays the previous page of a multiple page record.
Full	F	Calls up the full record display.
Copy	C	Calls up the copy availability display.
Brief	B	Gives one-line bibliographic descriptions.
Search History	S	Lists up to 9 searches and the records that match the search term(s).
Browse	Control W	Gives you the closest alphabetical match to your search term(s).
Keyword	Control K	Gives you the number of records that contain your search keywords.

Ring System Searching on DIALOG™



Camptothecin

```
?B301
File 301:CHEMNAME(TM) 1967-Jan89
? SELECT SY=CAMPTOTHECIN
    S1      2 SY=CAMPTOTHECIN
?TYPE s1/5/1
 1/5/1
    CAS REGISTRY NUMBER: 31456-25-4
    FORMULA: C20H16N2O4
    RING SYSTEM DATA:
    (01) (nr=05; sr=5,6,6,6,6; ar=C4N.01-C5N.02-
C5O.01-C6.01; fr=NC4.01-NC5.02-OC5.01-C6.01;
ir=7726-21-4)
    CA NAME(S):
    HP=1H-Pyrano(3',4':6,7)indolizino(1,2-b)quinoline-
3,14(4H,12H)-dione
(9CI), SB=4-ethyl-4-hydroxy-, ST=(.PM.)-
    HP=Camptothecine (8CI), ST=(.PM.)-
    SYNONYMS: (.+-.)-Camptothecine; (.+-.)-
Camptothecin; dl-Camptothecin;
```

NR=Number of Rings

Ring System Multiplier

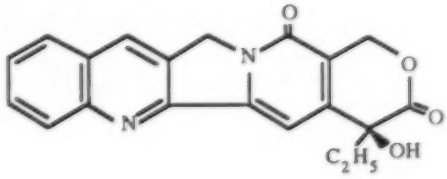
IR=Identity of Rings

SR=Size of Rings

AR=Analysis of Rings

FR=Formula of Rings

NUMBER OF RINGS (NR=). This is a two digit, left-zero-filled number which indicates the number of rings in a specific ring system. In this case **NR=05** i.e. there are 5 rings that make up the camptothecin molecule.



The Number of Rings is an indication of the complexity of a ring system and is best used in conjunction with search terms which specify some other ring data about the ring system. Camptothecin (and many other structures) can be retrieved when the (S) operator is used to link the NR= term with another term or terms describing the ring system. For example, **?S NR=05(S)FR=NC4** would retrieve ring systems containing five rings of which at least one of the rings is an NC4 ring.

SIZE OF RINGS (SR=). The size of rings term is a count of the atoms in each ring of a unique ring system. For ring systems with two or more rings, the size of each ring in the system is listed in ascending order, separated by commas. For example in camptothecin we know there are 5 rings in the ring system (NR=05). Note that four of these rings are six membered and one has five members. Therefore **SR=5,6,6,6,6.**

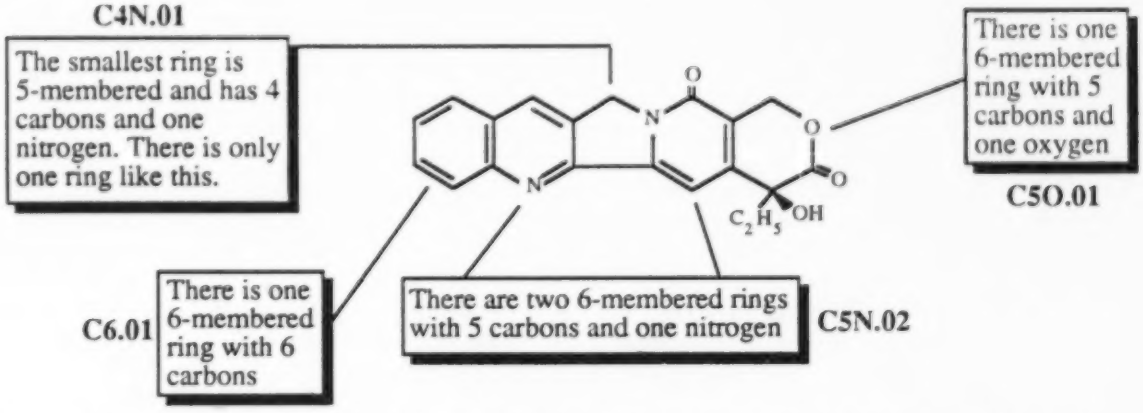
A SELECT statement such as **? Select SR=5** retrieves **all** substances which contain one or more five-membered rings either as part of a multiple ring system or one or more isolated five-membered rings.

To restrict retrieval to those substances with one or more isolated five-membered rings, the /FF suffix is used with the term, e.g., **? Select SR=5/FF.** The substances retrieved by this command include at least one isolated five-membered ring and may or may not include additional ring systems of other sizes.

To retrieve ring systems containing multiple rings, the sizes of the individual rings within the ring system are listed in ascending order. For example **? Select SR=4,5** will retrieve substances containing at least one ring system with a four- and a five-membered ring.

Meaningful search results can be achieved by linking the SR= term with another term via the (S) operator. For example to retrieve substances with at least one four-membered ring containing carbon and nitrogen, the Component of Rings (CR=) may be used as follows: **?Select SR=4 (S)CR=CN.**

ANALYSIS OF RINGS (AR=). This field presents the formula of each unique ring with element symbols listed in Hill Order (Carbon followed by hydrogen followed by any other element in alphabetical order; If no carbon is present then all elements in alphabetical order), followed by a two-digit multiplier indicating the number of occurrences of that ring in the ring system. For ring systems with two or more rings, the term lists the rings in ascending order by ring size and carbon count. For camptothecin **AR =C4N.01-C5N.02-C5O.01-C6.01.**


C4N.01
The smallest ring is 5-membered and has 4 carbons and one nitrogen. There is only one ring like this.
There is one 6-membered ring with 5 carbons and one oxygen
C5O.01
C6.01
There is one 6-membered ring with 6 carbons
There are two 6-membered rings with 5 carbons and one nitrogen
C5N.02

A broad search such as **? Select AR=C5O** will retrieve substances that include the C5O ring either as an isolated ring or as part of a multiple ring system. One or more C5O rings may be present.

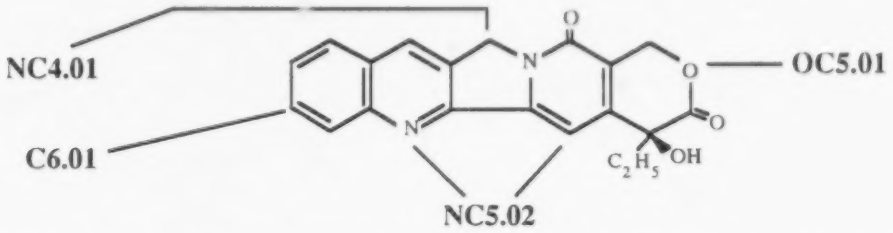
More specific results are obtained when a two digit multiplier is included, e.g., **? Select AR=C5O.01.** The substances retrieved include those which have one or more ring systems consisting of at least an **isolated** C5O ring. The total number of occurrences of a ring system with a given AR= term in a substance may be specified by appending a second two-digit multiplier. For example **? Select AR=C5O.01.02** retrieves only those substances which include **two** isolated C5O ring systems. Other ring systems may be present.

Identical rings can be retrieved e.g., **? Select AR=C5O.01(S)02.** This retrieves all substances with two identical C5O rings. Other rings may also be present in these substances.

The analysis of rings for multiple ring systems has a hyphen connecting the data for the individual rings of the ring system, in order of increasing ring size. **?Select AR=C5O.01-C6.01** retrieves all substances with at least one two-ring system containing a C5O ring and a C6 ring. Other ring systems may be present also.

Again, for identical ring selection: **?Select AR=C5O.01-C6.01(S)02** retrieves substances which include two ring systems, each containing a C5O ring and a C6 ring.

FORMULA OF RINGS (FR=). This indicates the arrangement of elements in a ring graph. For all ring systems consisting of atoms of only one element, the formula of rings is identical to the analysis of rings. For all ring systems consisting of two or more different elements, the formula is derived by starting with the smallest ring and lowest alphabetical **non-carbon** element symbol (i.e., N before O) and then moving around the ring in the shortest path to the next non-carbon atom. The use of multipliers is the same as for Analysis of Rings terms. For camptothecin **FR=NC4.01-NC5.02-OC5.01-C6.01.**



Broad retrieval is obtained if the Formula of Rings is searched without any multipliers, e.g., ? **Select FR=NC5** which will retrieve substances which include one or more NC5 rings either isolated or part of a multiple ring system.

More specific results are obtained when the two-digit multiplier is included: **? Select FR=NC5.01** will retrieve substances which have one or more ring systems consisting of at least an **isolated** NC5 ring. Substances that have the NC5 ring in a multiple ring system are excluded when the ring system multiplier is included. Still more specific results are obtained if a second two-digit multiplier is included in the FR= term to specify the total number of occurrences of a ring system in a substance, e.g., **?Select FR=NC5.01.03.** This will retrieve substances which include a total of three isolated NC5 ring systems. The three ring systems may or may not have identical bonding. Other ring systems may or may not be present in the substance.

The (S) operator can be used with the ring system multiplier to retrieve substances with identical NCNC2 rings, e.g., **? Select FR=NC5.01(S)03** which would retrieve all substances with at least three identical NC5 rings.

The Formula of Rings for multiple ring systems has a hyphen connecting the data for the individual rings of the ring system, in order of increasing size. **? S FR=NC5.01-C6.01** would retrieve all substances with one or more two-ring systems, each containing an NC5 ring and a C6 ring. The ring systems may or may not be identical. Other ring systems may also be present in the substance.

As illustrated before, more specific results can be obtained by appending a second two-digit multiplier, to indicate how many ring systems in the substance should have the specified Formula of Rings, e.g., **? Select FR=NC5.01-C6.01.02** which retrieves all substances which include two of these two-ring systems, each containing an NC5 ring and a C6 ring. The ring systems may or may not have identical bonding. Other ring systems may also be present.

As before, retrieval of identical ring systems, is achieved using the (S) operator, to link the ring

system multiplier with the Formula of Rings for that ring system, e.g., **? Select FR=NC5.01-C6.01(S)02** which retrieves substances which include two identical two-ring systems, each containing an NC5 ring and a C6 ring. Other ring systems may also be present.

RING SYSTEM MULTIPLIER. The Ring System Multiplier is a two-digit, left-zero-filled number which does not have an associated prefix or suffix. It indicates the number of times a unique ring system occurs in a substance.

Previous examples have shown the Ring System Multiplier appended to an Analysis of Rings term or a Formula of Rings term to specify the number of times the term should appear in a substance.

Previous examples have also shown the Ring System Multiplier linked to any ring data field using the (S) operator to specify that the data must refer to identical ring systems.

IDENTITY OF RINGS (IR=). The Identity of Rings is composed of three segments. The first segment identifies the graph (skeleton) of the ring system. The nodes (ring atoms) are identified by the second segment, and the bonding is identified by the third segment. The numbers representing the node and bond segments for a specific graph are arbitrarily assigned.

The Identity of Rings provides the most specific search term available for describing each complete ring system within a substance based on the skeleton of the ring system, the atoms in that skeleton, and the bonding between the atoms. The IR= field can be used to locate all substances which contain a given ring system as a substructure. For example, the Identity of Rings assigned to the naphthalene ring system is 591-49-57. All substances containing at least one isolated naphthalene ring system can be retrieved by **? Select IR=591-49-57**.

Broader search results are obtained if the Identity of Rings term is searched using truncation after the hyphen, e.g., **? Select IR=591-49-?** which includes substances with the specified ring system graph and nodes, but with bonding variations from totally saturated to totally unsaturated.

A still broader search is to specify the ring system at only the graph level. For example **? Select IR=591** which retrieves all substances with the 6,6-membered ring systems regardless of the atoms in the skeleton and the bonding between the atoms.

The (S) operator can be used to link Identity of Rings term to other ring data. For example **? Select IR=591-49-57(S)02** will retrieve substances with two identical isolated naphthalene ring systems.

To locate the Identity of Rings for a particular ring system, one of the following techniques can be used online: 1) search a known substance which contains the ring system, using the complete name (CN=) term. 2) Use the AR= or FR= field with the ring multiplier combined with the term RING-PARENT e.g., **? Select RING-PARENT AND FR=C5.01** which would retrieve the correct IR= term for cyclopentane. 3) Use the MF= with the /FF suffix combined with the FR= term e.g., **? S MF=C4H4N2/FF AND FR=NCNC3.01** which gives the IR= term for pyrimidine.

A list of common IR= terms and associated rings can be found in the DIALOG book in room 309. Remember the three segments i.e., **? S IR=46-150-18** will retrieve all compounds containing a benzene ring; **? S IR=46-150-?** will retrieve all 6-membered carbon rings and **?S IR=46** will retrieve all 6-membered rings.

COMPONENT OF RINGS (CR=). This field lists the elemental composition of each ring system or all the ring systems of the substance in Hill order regardless of the number of occurrences of

each atom in a substance.
The CR= field is searchable but does not display separately from the AR= term. This field provides a broader search approach than the Analysis of Rings field in that the number of occurrences of each element in the ring skeleton is not specified. For example, to retrieve all substances with ring systems consisting of carbon, nitrogen and oxygen, the following could be used: **? Select CR=CNO**. The ring systems retrieved may be of any size. The retrieved substances may have additional ring systems which may include other elements

Common elements in the Component of Rings field may yield a very large number of hits. More unusual elements will yield a manageable number.

ELEMENTS OF RINGS (ER=). The Elements of Rings field lists the count of all the atoms of each element contained in the graph (skeleton) of each ring system or the ring systems of the substance as a whole. Each term consists of the element symbol followed by a four-digit, left-zero-filled number.

Again, less common elements will yield manageable results. For example to retrieve substances with two silicon atoms in the ring system of the substance, use the following: **? S ER=SI0002**.

A range may be specified in the ER= field. For example, **? S ER=S0002:ER=S0004** will retrieve substances with ring systems that contain 2 to 4 sulfur atoms.

TOTAL NUMBER OF RINGS (TR=). The Total number of Rings field lists a two-digit, left-zero-filled number which is a count of all the rings in a substance.

The Total number of Rings field includes an additional term, TR=00, which provides easy access to all substances without any rings. For example, **? S TR=00 AND EC=C0008 AND NM=KETONE** will retrieve ketones with 8 carbon atoms which do not contain any rings.

GLOSSARY

BITNet (see also CREN)
BITNET (Because Its Time Network) is a network connecting academic and other institutions for communication of messages and information. BITNET has direct connections to more than 200 computer sites at various campuses throughout the world. BITNET's main function is the communication of information.

Bluesheets
The Bluesheets are Dialog's printed guides to all the files available.

Catalog Plus
Catalog Plus is CSU-Chico's online library library catalog. The online catalog provides access to the library's book, periodical, and nonprint media collections. Current location and circulation status are immediately available.

CIP™
The Classroom Instructional Program is a low cost program for educational institutions that offer online searching in a supervised classroom setting. The program is offered by Dialog Information Services, Inc. 3460 Hillview Avenue, Palo Alto, CA 94304, (800)-334-2564.

CREN (see also Bitnet)
CREN is the Corporation for Research and Educational Networking. Formerly known as Bitnet, CREN consists of a nationwide network of computer systems linked via telephone and other communication lines.

DIALOG™
The World's largest database provider. Dialog Information Services, Inc. 3460 Hillview Avenue, Palo Alto, CA 94304, (800)-334-2564.

DIALORDER™
Dialog's online document procurement service.

E-mail
Electronic mail.

FTP
FTP, File Transfer Protocol, is a utility which lets users access files on other computers which support the TCP/IP protocols. You can use FTP to get files from archive sites or from a colleague who wants to let you copy some files.

Internet
The Internet is a collection of over 700 interconnected computer networks. All of the computers on the Internet implement the TCP/IP (Transmission Control Protocol/Internet Protocol) suite of protocols to connect to the network. These protocols allow one computer network to interact with other physically different computer networks. Computer users on the Internet can share resources such as logging on to remote computers, file transfer with remote computers and sending and receiving electronic mail with colleagues at remote sites.

Macro Key
Software is programmed such that a keystroke enables a series of operations to occur. Such a keystroke is a macro key.

GLOSSARY

MELVYL
The MELVYL CATALOG is the online database for materials in the University of California libraries and the California State Library. As of 4/13/90, the system has approximately 5,509,848 titles.

Password
A combination of letters and numbers that allow access to a database. A form of security that keeps unauthorized personnel from accessing the database.

TELNET
Telnet is the INTERNET standard protocol for remote terminal connection service. TELNET allows a user at one site to interact with a remote timesharing system at another site as if the user's terminal or microcomputer was connected directly to the remote computer. Once you establish the session, all commands are passed to the remote computer for processing.

Yellowsheets
The Yellowsheets are the printed guide to the vendors available on Dialorder™. These sheets are helpful in selecting a vendor and getting an approximate cost for document procurement.

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